onset®

HOBOware

User's Guide

HOBO®

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Chapter 1: An Overview of HOBOware

HOBOware software is used for launching, reading out, and plotting data from HOBO® data loggers and wireless HOBO data nodes.

HOBOware Pro combines fast logger launch and readout functions with powerful data plotting capabilities, making it easy to analyze data recorded with HOBO data loggers and HOBO wireless data nodes. An intuitive interface allows you to select data parameters to display, format graphs, perform analysis, and save projects for future use. You can also export data to Microsoft® Excel® or other ASCII-compatible programs for additional analysis.

HOBOware Lite is entry-level software for HOBO USB loggers, offering easy logger launch, readout, and data plotting.

Getting Started

If you are using HOBO data loggers, follow the instructions in the Getting Started Guide to install the software, connect your logger, launch, and readout data. You can expect to be comfortable with HOBOware fundamentals within a few minutes.

If you are using wireless data nodes, see the HOBO Data Nodes: System Overview.

Refer to the sections outlined below, depending on what hardware you are using.

All Users

- Installation
- Reference

Data Loggers

If you are using HOBO data loggers (such as the U14 or H12 series), refer to the following sections:

- Working with HOBO Data Loggers
- Plotting and Analyzing Data

Wireless HOBO data nodes

If you are using HOBO wireless data nodes, refer to the following sections.

- System Overview in Managing a HOBO Data Node Network
- Plotting and Analyzing Data

Other Hardware

Refer to Other Hardware if you are using a HOBO U30 Station, a HOBO Shuttle, or FlexSmart Modules/Analog Sensor Ports.

Notes:

- Any differences for HOBOware Pro and HOBOware Lite, for Windows® or Macintosh® are noted.
- Screen captures of windows are English versions. If you have a version of HOBOware in another language, see the software for the translated windows.

Introduction to HOBOware Pro

Overview

With HOBOware Pro, you can quickly launch, read out, and plot data recorded by HOBO data loggers. HOBOware Pro allows you to analyze and view data numerous ways, including:

- Filtering data to extract key series information such as minimum, maximum, or average values.
- Scaling data to sensor units,
- Saving graphs for future use,
- Single-file exporting or bulk exporting, and
- Working in Secure mode for 21 CFR Part 11 compliance.

In addition, HOBOware Pro includes HOBOnode Manager for configuring and maintaining a wireless HOBO data node network.

See New HOBOware Pro Features and Advanced HOBOware Pro Features for additional details.

To upgrade from HOBOware Lite to HOBOware Pro, call 1-800-564-4377 and ask for Onset Customer Service.

Getting Started

To get up and running quickly, follow the instructions in the Getting Started Guide to install the software, connect your logger, launch, and read out data. You can expect to be comfortable with HOBOware fundamentals within a few minutes.

If you are using HOBO Wireless Data Nodes, see the HOBO Wireless Data Node Setup Guide.

Devices

HOBOware Pro is compatible with the following devices:

- HOBO U-Series loggers
- HOBO Weather Stations, including HOBO U30 Station
- HOBO Micro Stations
- HOBO Energy Logger Systems
- HOBO U-Shuttle and Waterproof Shuttle
- HOBO FlexSmart Modules
- HOBO Data Nodes (Wireless Sensors)
- HOBO 4-Channel Pulse Input (UX120-017)
- Energy and Power Meter (T-VER-E50B2)

Introduction to HOBOware Lite

HOBOware Lite is entry-level software for HOBO U-Series loggers, offering the following features:

- Easy logger setup/launch and readout
- Quick check of logger status and current readings
- Graphing and analysis with the ability to view multiple data files on one graph
- Filters to extract key series information such as minimum, maximum, or average values
- The ability to save changes to graphs in a project file
- Export of ASCII text data to Microsoft Excel or other programs for further analysis

You can open the following files in HOBOware Lite:

- .hobo - including files created with Onset's GreenLine software and both Macintosh and Windows - compatible versions of HOBOware Lite and HOBOware Pro.
- .hsec
- .hproj

To upgrade from HOBOware Lite to HOBOware Pro, call 1-800-564-4377 and ask for Onset Customer Service. An upgrade to HOBOware Pro is required for certain devices.

New HOBOware Features

The following new features are available in HOBOware 3.2:

- A redesigned launch window for quick logger configuration and easy sensor setup.
- Faster processing times for opening large data files (512KB and up).
- The ability to configure filtered series when launching the logger, which automatically generates custom series, such as average temperature per day, when you read out the logger and plot data.
- The ability to configure Pulse Scaling, Linear Scaling, and kWh Data Assistant series when launching any logger with applicable external sensors
- Support for the new HOBO 4-Channel Pulse Input Data Logger (UX120-017x), including advanced sensor configuration for setting maximum pulse frequency and lockout times as needed in raw pulse and event channels.
- Support for the new E50B2 Power and Energy Meter (T-VER-E50B2), including single-step configuration with the HOBO 4-Channel Pulse Input Data Logger (UX120-017x) and automatic calculation of numerous additional data series for analysis.
- Support for the new HOBO Conductivity Logger (U24-002).
- The option to disable logging the battery channel by default on some loggers, which can extend battery life and memory space.

Note: Loggers launched in HOBOware 3.2 with series created by the Pulse Scaling, Linear Scaling, and kWh Data Assistants or with filtered series cannot be read out in earlier versions of HOBOware.

Advanced HOBOware Pro Features

Setup Assistant

When you open HOBOware Pro for the first time, you are greeted by the HOBOware Setup Assistant, a series of windows to help you quickly change some key preference settings for device types and serial ports, units of measurement, and data assistants. See HOBOware Pro Setup Assistant for more information.

Data Analysis

Analysis features can be used to extract key information from logged data. You can create new data series, which can be graphed or exported. You can also filter data over user-specified intervals that can be in seconds, minutes, hours or days. The Subset Statistics tool (included with HOBOware Pro) calculates statistics over a user-defined interval.

Time-Saving Options

Launching

By default, HOBOware Pro displays the Launch window when you initiate a launch. If you want to skip the launch window and launch the logger with the default settings, choose *Automatically launch*. This is particularly useful if

you want to launch many loggers quickly without changing any settings. For more information, see Launch Time-Saving Options.

Readout

This feature allows you to skip a number of default actions when reading out a logger (such as being prompted to saving or the Plot Setup window). For more information, see Readout Time-Saving Options.

Viewing Subset Statistics

The Subset Statistics feature allows you to select a range of data in a graph, and display the maximum, minimum, average and standard deviation for the measurements in that range. See Viewing Subset Statistics for more information.

Tools

The Alarm and Readout Tool

The Alarm and Readout Tool is designed to continuously monitor critical areas, and allow you to receive instant notification if conditions exceed limits using this enhancement to HOBOware Pro.

The Bulk Export Tool

The Bulk Export Tool makes it easy to export data from many logger data files at once. This tool is a free add-on for HOBOware Pro.

Data Assistants

HOBOware Pro Data Assistants let you create new data series by combining data recorded by the logger with additional data that you enter before you display the plot. For example, the kWh Assistant converts logged pulse data from an energy transducer to kWh, average kW, and energy cost.

All Data Assistants can be run from the Plot Setup window after you read out a logger or open a datafile. With this method you need to run the Data Assistant each time you read out the logger or open a datafile.

Linear Scaling, Pulse Scaling, and kWh Data Assistants can also be used at launch time for some loggers to automatically create series each you read out the logger or open a data file. This feature is available for the HOBO U30, HOBO H21 (Weather Station and Micro Station), HOBO H22 (Energy Logger), HOBO U12, and HOBO UX120-017x loggers with supported sensors attached.

For more information, see HOBOware Pro Data Assistants.

Export Data to Other Programs

- One-click export to Microsoft Excel® or other ASCII-compatible programs
- Bulk File Export Tool provides easy way of exporting many data files at once
- Export in Onset Box Car Pro format
- International date and time formats
- Copy and paste graph images into other programs

Installing HOBOware

You can install HOBOware from the Onset Web site or from the Installation CD.

The first time you install HOBOware it will be in Trial Mode. You will need to activate it entering your license key, or continue to run it in Trial Mode until the trial expires. If you are updating an existing version of HOBOware you will not need to activate HOBOware. See Activating HOBOware (page 15).

Before You Begin

- README file

Refer to the HOBOware website at http://www.onsetcomp.com/HOBOware or the README file on the installation CD for detailed information about the hardware and software needed to run HOBOware. If you have additional questions, please contact Onset Technical Support .

- License Key

When you purchase HOBOware, your email receipt will include a license key. If you purchased HOBOware online, the license key is also displayed in the online receipt. After you install HOBOware and run it for the first time you will be prompted to enter the license key.

Installing HOBOware from the Onset Web Site

To download HOBOware from the Onset Web site, go to the following URL and follow the instructions for downloading and installing HOBOware:

http://www.onsetcomp.com/products/software

When you install HOBOware form the web it will be in Trial mode until you enter your License Key.

Installing HOBOware from the Installation CD

To install the software from the CD:

Windows

1. Insert the CD in your computer's CD-ROM drive.

   The installation program should start automatically. If it does not, navigate to the CD drive in My Computer or Windows® Explorer and double-click HOBOware_Setup.exe to launch the HOBOware installer.

   NOTE: HOBOware for Windows requires the Java Runtime Environment. If the correct Java Runtime Environment version is not already installed on your computer, the HOBOware Setup program will ask if you want to install it now. (You must be logged in as an administrator on your computer to install the Java Runtime Environment.) Click Yes and follow the prompts. After Java Runtime Environment is installed, the HOBOware installation will continue.

2. Follow the prompts to install HOBOware.

   HOBOware should open automatically when the installation is complete. If it does not open by itself, double-click the HOBOware icon on your desktop or Quick Launch menu. Or, from the Start menu, select **Programs** > **Onset Applications** > **HOBOware**.

Mac

1. Insert the CD in your computer's CD-ROM drive.
2. Double-click the CD icon in the Finder and double-click the HOBOware.pkg to launch the HOBOware installer.
3. When you reach the final screen of the installation program, click Restart.
4. After restarting, open HOBOware by double-clicking the HOBOware icon in your computer's Applications folder.
5. Proceed to Activating HOBOware.

Software Updates

If you have an Internet connection, HOBOware will periodically ask if you would like it to check the Onset website for software updates. The default is to check once per week, but you can configure HOBOware to check daily or monthly.

Go to **Preferences** > **General** > **Startup** > **Check for HOBOware updates**.

If you do not have an Internet connection, choose *Never*.

You may check for updates manually at any time by clicking **Check for Updates** from the **Help** menu.

NOTE: If you are using HOBOnode Manager with HOBO Data Node Wireless Network, you must stop device communication to upgrade HOBOware.

Upgrading to HOBOware Pro

To upgrade from HOBOware Lite to HOBOware Pro, call 1-800-564-4377 and ask for Onset Customer Service.

Activating HOBOware

The first time you install HOBOware it will be in Trial Mode. You will need to activate it entering your license key, or continue to run it in Trial Mode until the trial expires.

NOTE: If you are updating an existing version of HOBOware you will not need to activate HOBOware.

Locating your License Key

When you purchase HOBOware your e-mail receipt will include a license key. If you purchase HOBOware on-line, the license key is also displayed in the on-line receipt.

License Key Manager Window

The first time you open HOBOware the License Key Manager window will appear. Enter your license key in the License Key text box to activate the Full Version of HOBOware. This is the only time you will have to enter your License Key, even if you upgrade to another version.

Enter License Key to run Full Version
License Key Manager
Thank you for installing HOBOware.
I have a HOBOware license key.
ENTER LICENSE KEY
Your license key (####-####-####-####) is located:
On the front of the CD case, or
On your order confirmation email
NOTE: You will need to restart HOBOware after you update the license key.
I want to use HOBOware Pro Trial.
(Available for 30 days from installation)
You will be able to enter a license key at any point after installation.
Please visit www.onsetcomp.com/hoboware for more information on HOBOware licensing or call 1-800-LOGGERS for assistance.
OK

HOBOware Setup Assistant (HOBOware Pro Only)

When you open HOBOware Pro for the first time, you are greeted by the HOBOware Setup Assistant, a series of windows intended to help you quickly change some key settings for device types and serial ports, units of measurement, and data assistants. To run the Setup Assistant, click **Start** and follow the prompts to change some key preferences.

NOTE: The Setup Assistant is optional. If you click **Cancel**, you will be able to use HOBOware Pro with its default settings.

Setup Preferences

Device Types

Serial Port(s) to use:

- Support serial devices on COM1 (Windows)
- Support serial devices on the default serial port only (Mac)

The default is USB. If you enable Serial Devices you can select the port to use.

Unit System

- US (default)
- SI

Data Assistants

Select the installed Data Assistants you want to show when relevant data is present. All loaded Data Assistants are checked by default. You can also load a new Data Assistant.

Running the Setup Assistant at a Later Time

To run the Setup Assistant at any time, go to:

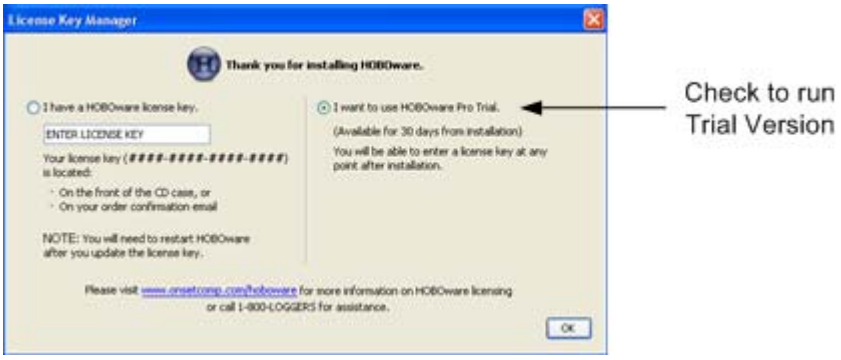
Windows: **File** > **Preferences** > **General**

Mac: **HOBOware** > **Preferences** > **General**

and click the **Setup Assistant** button in the bottom right of the pane.

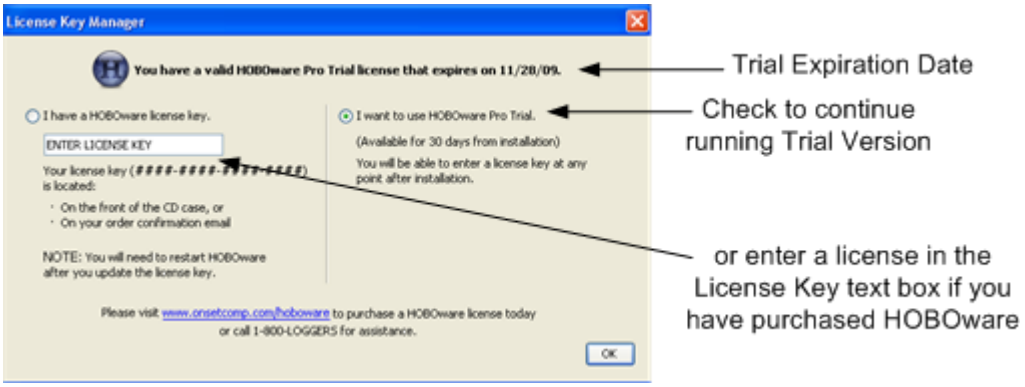
Using a Trial Version of HOBOware

The first time you open HOBOware the License Key Manager window will appear. To run a Trial Version, check *I want to use HOBOware Pro Trial* and click OK.


License Key Manager
Thank you for installing HOBOware.
I have a HOBOware license key.
ENTER LICENSE KEY
Your license key (####-####-####-####) is located:
· On the front of the CD case, or
· On your order confirmation email
NOTE: You will need to restart HOBOware after you update the license key.
I want to use HOBOware Pro Trial.
(Available for 30 days from installation)
You will be able to enter a license key at any point after installation.
Please visit www.onsetcomp.com/hoboware for more information on HOBOware licensing or call 1-800-LOGGERS for assistance.
OK
Check to run Trial Version

The date your trial will expire appears at the top of the HOBOware window.

Each time you open a Trial Version the License Key Manager window appears. Check *I want to use HOBOware Pro Trial* to continue using the Trial Version, or, if you have purchased HOBOware, enter the license key in the License Key text box.


License Key Manager
You have a valid HOBOware Pro Trial license that expires on 11/28/09.
I have a HOBOware license key.
ENTER LICENSE KEY
Your license key (####-####-####-####) is located:
· On the front of the CD case, or
· On your order confirmation email
NOTE: You will need to restart HOBOware after you update the license key.
I want to use HOBOware Pro Trial.
(Available for 30 days from installation)
You will be able to enter a license key at any point after installation.
Please visit www.onsetcomp.com/hoboware to purchase a HOBOware license today or call 1-800-LOGGERS for assistance.
OK
Trial Expiration Date
Check to continue running Trial Version
or enter a license in the License Key text box if you have purchased HOBOware

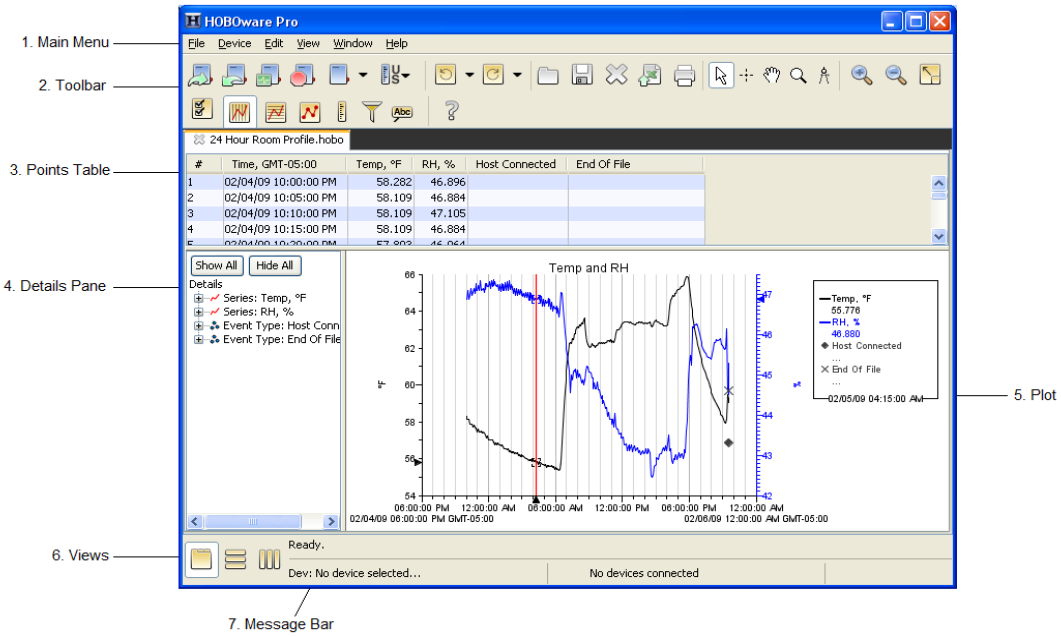
Trial Expiration

When the trial expires you will be prompted to enter a license key before you can continue using HOBOware.

License Key Manager
Your HOBOware Pro Trial has expired.
If you have purchased a license key, enter it below.
ENTER LICENSE KEY
Your license key (####-####-####-####) is located:
· On the front of the CD case, or
· On your order confirmation email
NOTE: You will need to restart HOBOware after updating the license key.
Please visit www.onsetcomp.com/hoboware to purchase a HOBOware license today or call 1-800-LOGGERS for assistance.
Cancel
OK

A Tour of the HOBOware Interface

The illustration below shows the HOBOware main window, including a plot generated from opening an existing data file.

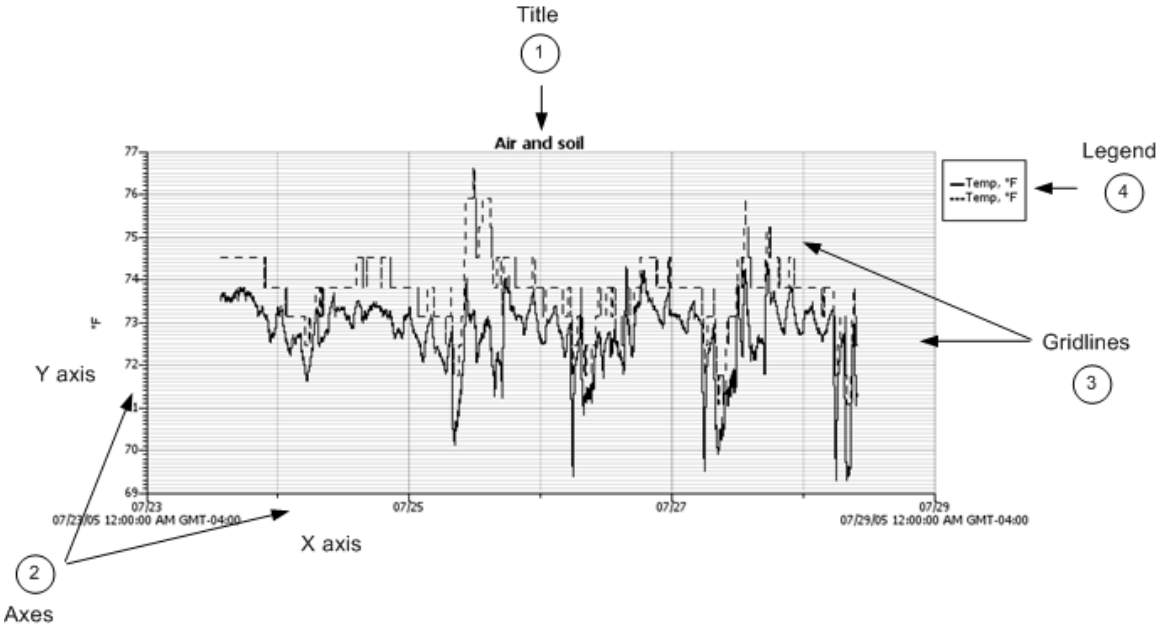


1. Main Menu - From the Main Menu you can perform operations on a device or a project.
2. Toolbar - The toolbar includes icons for performing operations on a device as well as tool to manipulate a plot or graph. For more information see The Toolbar 213.
3. Points Table - Logger data presented in a tabular format. See The Points Table 21.
4. Details Pane - Information and statistics about the launch. See The Details Pane on page 20.
5. Plot - A graphical representation of the sensor readings and events. See Overview of a Plot on page 19.
6. Views - Use these icons to toggle between views when you have multiple plots open.
7. Message Bar - Indicates devices connected as well as various actions in progress (such as readout, launch).

Overview of a Plot

A plot is a visual representation of the series you selected to view when you opened the plot.

To change default plot settings, see Plotting Preferences on page 224.



1. Title

   Title of the graph (default is the description entered at launch). Show or hide the Title from the **View** menu.

   To change the title properties, double-click the title or select the title and click the Properties icon .

   The following options are available on the Title Properties window:

   Name: Enter up to a 40-character title for the graph. By default, the name is the description entered when launching the logger.

   Location: Move the title to either the top or bottom of the graph. The default location is the top of the graph.

   Font: Select a font type, size, and appearance.

2. Axes

   The graph can contain several value axes depending on the number of series displayed.

   Y axis

   Also called the *value axes*; displays the values for all sensor series, such as temperature in degrees Fahrenheit or Celsius, or battery level in Volts.

   X axis

   Also called the *time axes*; displays the time ranges for the data.

3. Gridlines

Show or hide vertical and horizontal gridlines from the **View** menu.

4. Legend

The legend is the area that lists the keys for each series (line colors and marker types). If the crosshair tool is in use, it also lists the date, time and point values currently selected by the crosshair. Show or hide the Legend from the **View** menu.

To change the legend properties, double-click the legend or select the legend and click the Properties icon .

The following options are available on the **Legend Properties** window:

Name: Enter up to a 40-character title for the legend. There is no default name.

Location: Move the legend to either the left or right side of the graph. By default, the legend appears on the right.

Show Border: Toggles whether a box is drawn around the legend. By default, a border is shown.

For secure files (HOBOware Pro: .hsec and .dsec; HOBOware Lite: .hsec) a padlock icon appears in the legend next to the names of the series that were verified as original data.

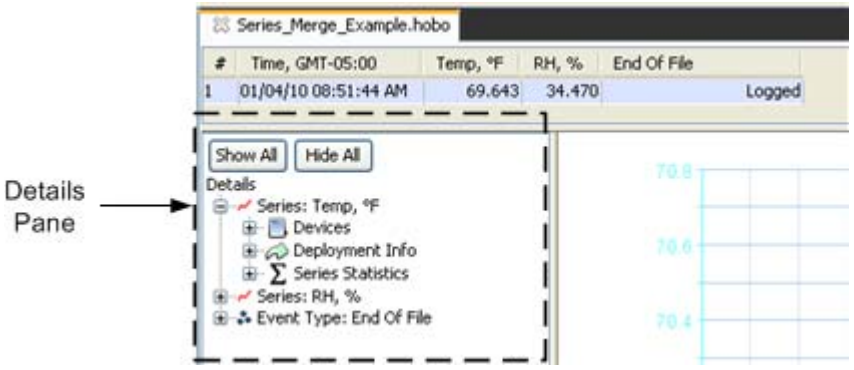
The Details Pane

For each series, event, and state, the Details Pane contains information and statistics, including:

- Devices - Device Info such as the model and serial number.
- Deployment Info - Such as series name, launch description, and launch time. (Does not apply to HOBO data nodes)
- Series Statistics - Such as number of samples, average reading, and sample time.
- Sensor information (for station-type loggers) - Including the sensor location, serial number, and resolution

In HOBOware Pro, if you do not want plots to open with the sensor location shown in the Points and Details panes, go to **Preferences** > **Plotting** > **Points Table and Details** pane and disable the "Include sensor Location (if available) in points table and details pane" option.

To display the Details pane in HOBOware Lite, choose **Details Pane** from the **View** menu. Choose **Details Pane** again to hide the pane.



- Deployment information - Such as the launch description, deployment number, start time and time zone, logging interval, and battery voltage at launch.

- Σ Series statistics - Including the total sensor samples and events, time of the first and last sample, and the maximum, minimum, average, and standard deviation for each sensor series in the plot
- Audit trail information for secure files

To fully expand the details tree, click the **Show All** button. To fully collapse the tree, click **Hide All**.

Click a series node in the details tree to select the corresponding series on the graph and corresponding column in the Points Table.

To print the details tree, go to the File menu and choose **Print Details**. To export the details tree to a text file, go to the File menu and choose **Export Details**.

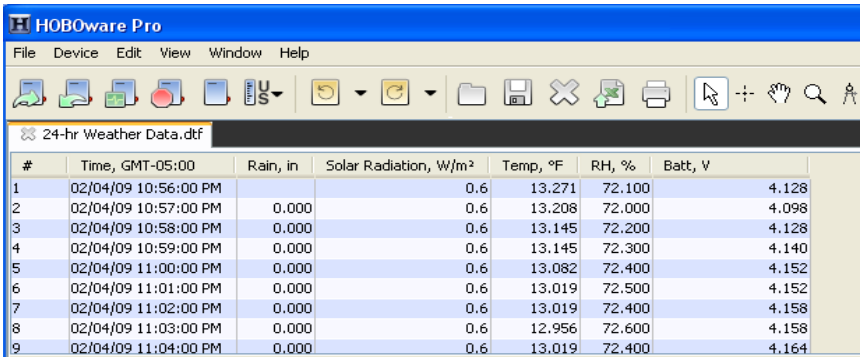
To resize the pane, drag the divider between the Details pane and the graph.

You can hide the Details pane. From the View menu, choose **Details Pane**. Choose **Details Pane** again to redisplay the Details pane.

NOTE: You can configure if the Details pane is shown by default with the *Show the details pane when plotting data option* in **Preferences** > **Plotting** > **Layout**.

The Points Table

The Points table lists logger data in a table. The Points table is linked to the graph: only the data for the sensor measurements, states, and events displayed on the graph are listed in the Points table.



#	Time, GMT-05:00	Rain, in	Solar Radiation, W/m²	Temp, °F	RH, %	Batt, V
1	02/04/09 10:56:00 PM		0.6	13.271	72.100	4.128
2	02/04/09 10:57:00 PM	0.000	0.6	13.208	72.000	4.098
3	02/04/09 10:58:00 PM	0.000	0.6	13.145	72.200	4.128
4	02/04/09 10:59:00 PM	0.000	0.6	13.145	72.300	4.140
5	02/04/09 11:00:00 PM	0.000	0.6	13.082	72.400	4.152
6	02/04/09 11:01:00 PM	0.000	0.6	13.019	72.500	4.152
7	02/04/09 11:02:00 PM	0.000	0.6	13.019	72.400	4.158
8	02/04/09 11:03:00 PM	0.000	0.6	12.956	72.600	4.158
9	02/04/09 11:04:00 PM	0.000	0.6	13.019	72.400	4.164

The data points are listed chronologically. All the measurements, state changes, and events recorded by the logger at a given time are listed in a single row. Each series is displayed in a column. You can resize the columns by clicking and dragging the dividers between the column headers.

Use the arrow keys or scroll bars to move up, down, left, and right in the Points table. Additionally, as you click the crosshair tool in the graph, the corresponding point is selected in the Points table; if you click a value or event cell in the Points table, the crosshair will appear on the graph at the time corresponding to that cell.

To print the points, go to the File menu and choose **Print Points** (available only with Java 1.5 or higher). To copy points, use the mouse to select the cells you want to copy, then press **Ctrl+Command-C** to copy them to the clipboard.

Tip: You can export the data points to a text file for use in Microsoft® Excel® or other programs.

To resize the pane, drag the divider between the Points table and the graph.

To hide the Points table, from the View menu, choose **Points Table**.

If you do not want the Points table to be displayed by default when you view data, go to **Preferences**> **Plotting** > **Layout** and disable "Show the points table when plotting data" option.

HOBOware Pro

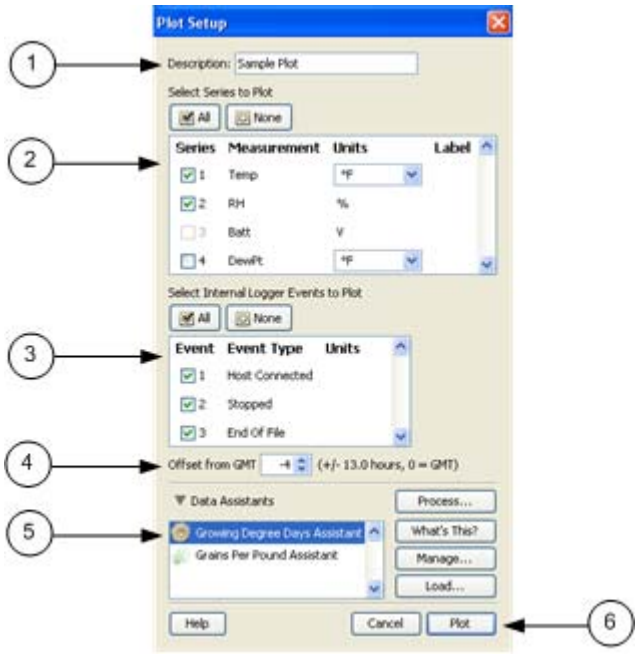
If you do not want plots to open with the sensor location shown in the Points and Details panes, disable the "Include sensor Location (if available) in points table and details pane" setting under **Points Table & Details Pane** on the Plotting Preference pane.

HOBOware Lite

To display the Points table, choose **Points Table** from the View menu. Choose **Points Table** again to hide the Points table.

The Plot Setup Window

After you read out a logger or open a saved datafile, the **Plot Setup** window appears.



1. Description - Enter text to describe the plot.
2. Select Series to Plot - Select the series you want to plot and the units, if applicable.
3. Select Internal Logger Events to Plot - Select internal logger events to plot (only available for some loggers).
4. Offset from GMT - Set the Time Zone Offset from GMT if required.
5. Data Assistants (HOBOware Pro Only) - See Data Assistants on page 78.

   HOBOware Pro Data Assistants let you create new data series by combining data recorded by the logger with additional data.

   NOTE: The following Data Assistants can also be run from the Launch window: Pulse Scaling, Linear Scaling, kWh.

6. Plot Button - Click this button to plot the selected data on a graph.

HOBOware Software Updates

If you have an Internet connection, HOBOware will periodically ask if you would like it to check the Onset website for software updates. The default is to check once per week, but you can configure HOBOware to check daily or monthly.

Go to **Preferences** > **General** > **Startup** > **Check for HOBOware updates**.

If you do not have an Internet connection, choose *Never*.

You may check for updates manually at any time by clicking **Check for Updates** from the **Help** menu.

Chapter 2: Working with HOBO Data Loggers

Working with HOBO data loggers involves the following basic steps:

1. Connect the logger to the computer for the initial setup and launch.
2. Launch the logger. Enter or select the appropriate parameters for the logger deployment and then launch, or start, the logger.
3. Check the status of the logger. You have the option of checking the current status of the logger and any current readings while it is still connected to the computer. This can be helpful to verify that the launch configuration is as expected.
4. Read out the logger. After deploying the logger, read out all recorded data and save it to a file. Many devices also work with shuttles that allow you to keep the logger in the field, but still read out any recorded data. You can then bring the shuttle back to the office, connect it to the computer, offload and save the files.
5. Plot the data. After reading out the logger and saving the data, you can select and define the data series you wish to plot in a graph. HOBOware Pro also provides Data Assistants for automatic scaling of certain data when plotting.
6. Analyze the data and customize the plot. There are numerous tools available for working with the data and changing the plot, such as exporting, filtering, merging files, cropping, and more.
7. Save changes to the plot as a project file. Changes to the axis, series, plot, and legend properties as well as any filtering or merging can be saved as a .hproj file.

NOTE: If you are configuring HOBO data nodes, see the summary of tasks on page 141 for setting up data nodes.

Connecting Devices

Most HOBO data loggers and shuttles connect to the computer with an Onset-supplied USB cable. The HOBO Weather Station, HOBO Micro Station, and HOBO Energy Logger connect to the computer with a serial cable (or to a USB port with a Keyspan™ serial adapter).

Some loggers require an optic USB base station/coupler to connect to the computer. Consult the manual that came with your device for specific information about required base stations/couplers or cables.

Refer to one of these topics for details about connecting your device to the computer:

- Connecting a USB Device (page 24)
- Connecting a Base Station/Coupler (page 25)
- Connecting a Serial Device (HOBOware Pro Only) (page 26)
- Connecting Multiple Devices (page 26)

NOTES:

- For instructions on connecting HOBOware compatible shuttles or using the HOBO Waterproof shuttle as a base station, refer to the shuttle's user guide.
- HOBOware Lite can be used with most HOBO U-Series Data Loggers, which communicate with the computer by connecting to a USB port.
- For details on working with HOBO Data Nodes, see System Overview.

Connecting a USB Device

You can connect most devices to the USB port by using an Onset-supplied USB interface cable.

Some loggers require an optic USB base station/coupler or serial cable (HOBOware Pro only) to connect to the computer. Consult the manual that came with your device for specific information about required base stations/couplers or cables.

NOTE (HOBOware Pro): For instructions on connecting shuttles, or using the HOBO Waterproof Shuttle as a base station, refer to the shuttle's user guide.

NOTE: If you are using a Base Station or Coupler, see Connecting a Base Station or Coupler (page 25).

Steps

To connect a logger or shuttle to HOBOware using a USB cable:

1. Open HOBOware.
2. Plug the large end of the USB interface cable into a USB port on the computer.
3. Plug the small end of the USB interface cable into the port on the device. (Refer to the diagram and instructions that came with the device if you need help finding the port.)

When the device is recognized by HOBOware, the right side of the status bar at the bottom of the HOBOware window will update to reflect the number of devices connected. At this point, you can begin using the device.

NOTES (Windows Only):

- If the device has never been connected to this computer before, it may take some time for the computer to detect the new hardware and report that it has connected successfully. One or more messages will appear, indicating that new hardware has been found. You may also hear a chime.
- Your computer may tell you to reboot before you can use the device. It is not necessary to reboot.

Disconnecting a Device

To disconnect the device, simply unplug it from the USB cable. Wait for the status bar to update the number of devices before continuing.

Connecting a Base Station or Coupler

Some loggers require an optic USB base station/coupler or serial cable to connect to the computer. Consult the manual that came with your device for specific information about required base stations/couplers or cables.

NOTES (Windows Only):

- If you are connecting a base station/coupler or logger that has never been connected to this computer before, it may take some time for the computer to detect the new hardware and report that it has connected successfully. One or more messages will appear, indicating that new hardware has been found. You may also hear a chime.
- You may be prompted to reboot you computer before you can use the logger. It is not necessary to reboot.

Steps

To connect a logger to a base station/coupler:

1. Open HOBOware.
2. Plug the base station/coupler cable into a USB port on the computer.

Important: Make sure the base/station coupler is the correct model for the logger you want to use. Consult the manual that came with the logger if you are not sure.

3. Attach the logger to the base station/coupler as described in the documentation that came with your logger.

When the logger is recognized by HOBOware, the right side of the status bar at the bottom of the HOBOware window will update to reflect the number of loggers connected. At this point, you can begin using the logger.

To disconnect a logger, simply unplug it from the base station/coupler. Wait for the status bar to update the number of devices before continuing.

To attach another logger via a base station/coupler, remove the logger, leaving the base station/coupler connected. Then connect the next logger.

Connecting a Serial Device (HOBOware Pro Only)

To connect a device to a computer using a serial cable:

1. Open HOBOware Pro.
2. Plug the 9-pin end of the serial interface cable into a serial port on the computer or Keyspan adapter.
3. Plug the other end of the serial interface cable into the communications port on the device. (Refer to the diagram and instructions that came with the device if you need help finding the port.)
4. Click the Select Device icon on the toolbar to ensure that the device is listed in the Select Device window. Click the button next to the device in the window, then click **OK**.
5. Configure Serial Port Settings (Optional)

   If you are using a serial port other than COM1 (PC) or Default (Macintosh), you will need to set up HOBOware to look at another port.

   To change the Serial Ports setting go to:

   PC: File > Preferences > Communications

   Mac: HOBOware Pro > Preferences > Communications

   Note that checking multiple serial ports can take some time, even when no devices are attached.

The status bar at the bottom of the HOBOware Pro window will update to reflect that the device is connected and selected. At this point, you can begin using the device.

To disconnect the device, simply unplug it from the serial cable.

Connecting Multiple Devices

Overview

If your computer has multiple USB and serial ports, you can connect multiple devices and work with one at a time (HOBOware Lite can only be used for USB Ports). When multiple devices are connected, the **Select Device** window opens every time you select *Launch*, *Readout*, *Stop*, or *Status* from the Main Menu.

Click the button next to a device on the list to select it, then click **OK**. The selected action will proceed.

To access the **Select Device** window at any time, click the **Select Device** icon on the toolbar, or choose **Select Device** from the **Device** menu.

With HOBOware Pro, if you work with multiple U-Series devices frequently, you can set the **Default Action** to *Launch* (Device menu) and enable Launch Time-Saving Options to work more efficiently.

NOTE (HOBOware Pro): If serial devices are selected in Preferences, it may take some time for HOBOware Pro to scan all of the serial ports. You can select the device you want as soon as it is displayed. You do not have to wait for all of the ports to be scanned.

Verifying Selected Device

If the **Blink Device Light** button is available, you can click it to verify that you have selected the appropriate device. This briefly illuminates the light on the devices that you have selected.

If the device does not have a light, or if the light is not visible when the devices is in the base station/coupler, simply check the serial number (S/N) on your devices to make sure that it matches the one that is selected in this window.

When the **Select Device** window is not open, you can check the status bar at the bottom of the screen to quickly determine which device is selected. The left side of the status bar indicates the model, description, and serial number of the device; the right side indicates the total number of devices connected.

NOTE (HOBOware Pro): Serial devices that you have added or removed are not reflected in the device count until you click the **Select Device** icon on the toolbar to update the device list.

Launching Devices

To set up a logger to record data, you must specify several parameters and launch, or start, the logger.

Tip: Check that the time on the computer is correct before configuring a launch. If it is not, close HOBOware, update your computer's clock manually or synchronize it with an online time server (if available) and then reopen HOBOware.

To launch a logger:

1. Connect the logger to the computer.
2. Click the Launch icon on the toolbar, or choose **Launch** from the Device menu.
3. Different messages may appear depending on the state of the logger. Answer each of the prompts accordingly:

   A warning appears if the logger has already been launched. Click **Yes** to continue, or click **No** to cancel.

   For U-Series loggers only (other than the HOBO U30 Station), a warning appears if the logger has recorded data since its last readout. Click Yes to proceed to the launch window, or click No to cancel the launch and read out the data first.

   Because loggers are tested before shipping, there may be data in your logger the first time you launch it. In this case, it is not necessary to read out the logger. Click Yes to proceed.
4. Configure the launch parameters in the Launch Logger window.
5. To verify that the sensors are working correctly or to review settings from the previous launch, click the Status button.
6. Click the **Start** button when you are finished setting the launch parameters (note that this text on this button changes depending on when you chose logging to begin).

HOBOware displays the progress of the launch and warns you not to unplug the logger while it is being configured.

Once the logger begins logging, it will continue logging until you stop it, the memory is full, or the battery runs out.

Launch Logger Window

Use the Launch Logger window to set up your logger to record data. The Launch Logger window is divided into the following three panes:

- **Logger Information:** The name of the logger currently selected appears at the top of this pane, which also includes the serial number, deployment number, and current battery level.

  Use the Description field to type up to a 40-character name for the logger deployment. The description you enter here will be used as the default file name when you read out the logger and save the data. It will also be the default title on the plot.

  Click the Status button in this pane to see the current status of the logger and the settings used on the previous launch.

  A User Notes button may also appear for some loggers. Click it to enter more extensive notes about the deployment.

- **Sensors:** This pane displays a list of the sensors available for the logger. Choose the sensors, or channels, that you wish to log in this deployment, and select any external sensors you may be using. This pane also displays any utilities available for your logger, such as Alarms, Scaling, and Filters.

- **Deployment:** Use this pane to select the logging interval (the rate at which you want the logger to record data) and to choose when the logger should begin recording data. This pane also displays the logging duration, which is the approximate time it will take to fill the logger memory based on the logging interval, sensors, and other settings currently selected.

  For some loggers, you can also set a sampling interval, choose when to stop logging, and select other options in this pane.

When you are done choosing the launch settings, click the button in the lower right-hand corner of the window to send the settings to the logger. Note that the button text changes based on when you chose to start logging.

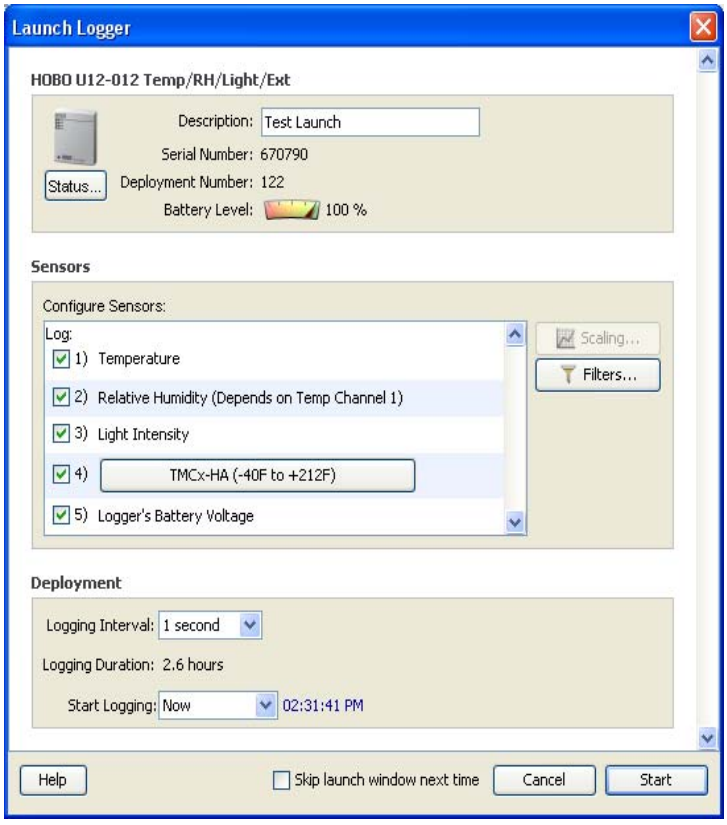
HOBOware Pro Tip: If you will be using the same launch settings for multiple deployments of the same logger type, select the Skip Launch Window Next Time checkbox to bypass this window the next time you launch a device. This will cause the next logger to be launched with either the previous launch settings or the current logger settings as set in Launch Time-Saving Options preferences.

The options available in the Logger Launch window vary depending on the type of logger you are using. For more details about launching your particular device, refer to the following topics:

- Launch Options for U-Series Loggers
- Launch Options for Station Loggers
- Launch Options for the HOBO 4-Channel Pulse Input Data Logger (UX120-017x)

Launch Options for U-Series Loggers

The following launch options and settings are available for most U-Series loggers. Note that the Launch Logger window may vary from the example shown below. For details on the launch options available on other loggers, see Launch Options for Station Loggers and Launch Options for the HOBO 4-Channel Pulse Input Data Logger (UX120-017x).



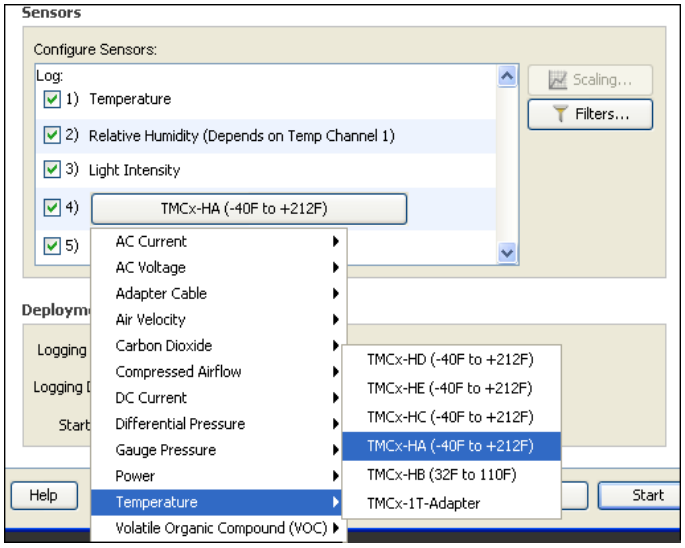
Logger Information

- **Description:** Enter a description for the launch, up to 40 characters, in this field. This description is used as the default file name when you read out and save the data recorded by the logger. It is also the default title of the plot.
- **Serial Number:** This is the serial number for the logger. Note that some external sensors also have serial numbers, which are not listed here.
- **Deployment Number:** This is the number of times (including this time) the logger has been launched. Each time you start a new launch, the deployment number increases by one.
- **Battery Level:** This shows the current battery level in the logger.
- **Status:** Click the Status button to check the logger settings used in the previous launch.

Sensors

The Sensors List displays all internal sensors and external channels available for recording data. Choose the sensors, or channels, you wish to log in this deployment. To configure an external sensor:

1. Make sure the checkbox is enabled for the external channel you wish to configure.
2. Click the button for the corresponding channel in the sensor list to select the sensor type as shown below. If the external sensor has not been configured, the button reads <Sensor Type Not Selected>. Otherwise, the previous sensor type selected will be displayed on the button.
3. Select the measurement category and then the specific sensor part number and range (if applicable). Note that the sensor part number must match the part number listed on the shrink tube on the sensor cable to record accurate data.
4. Repeat steps 1 through 4 for each additional external sensor you wish to configure.



Notes on configuring sensors:

- Although it is helpful to see the connected sensors when setting up the launch, it is not required that you connect the sensors during launch set-up. You may set up the launch for a delayed or push button start, then connect the sensors later, before logging begins. **Important:** Sensors that are connected after logging begins will not log any data. Alternatively, if you select an external channel, but do not plug the sensor in, false data will be recorded for that channel.
- Some loggers with RH or pressure sensors require that you also select the internal temperature sensor to log relative humidity or pressure. The dependency may be noted in the sensors list (see Relative Humidity channel in the example above). Refer to the manual that came with your logger for additional information.
- When both the internal temperature and RH sensors are selected, dew point will be calculated automatically.
- If external events or states are available for your logger, you can enter names to identify the event and state channels that are in use. You can also rename the Open and Closed descriptions for each state, and enter increments and units for each event channel.
- HOBOware Pro Data Assistants let you create new data series by combining data recorded by the logger with additional data. When you use a Data Assistant from the Launch Logger window, the parameter set is saved and applied to data every time you read out a logger or open the resultant data file. The derived data is also shown when you check the latest readings in the Status window. Click the Scaling button to access the Data Assistants window and choose the Linear Scaling or Pulse Scaling Assistant. Click the Create button to run the assistant. After you enter values, click Save. Sensors that support Data Assistants at launch time display the Scaling icon next to their name.
- Some loggers have alarm functionality. Click the Alarms button, if available, to set alarms as desired. Sensors that have alarm functionality display the Alarms icon next to their name.
- Click the Filters button to create an additional filtered series, such as average temperature per day, automatically when you read out the logger and plot the data.
- You have the option to record the logger's battery voltage at each sample time; this is the last channel in the sensors list. Like the other data channels, logging the internal battery channel consumes some of the logger's memory. Unless you suspect abnormal battery performance, you do not need to log the battery voltage. A U-Series logger (other than a HOBO U30 Station) will record a bad battery event even if it is not recording the battery channel. You can also disable the battery channel in the Launch Time-Saving Options (HOBOware Pro).

Deployment

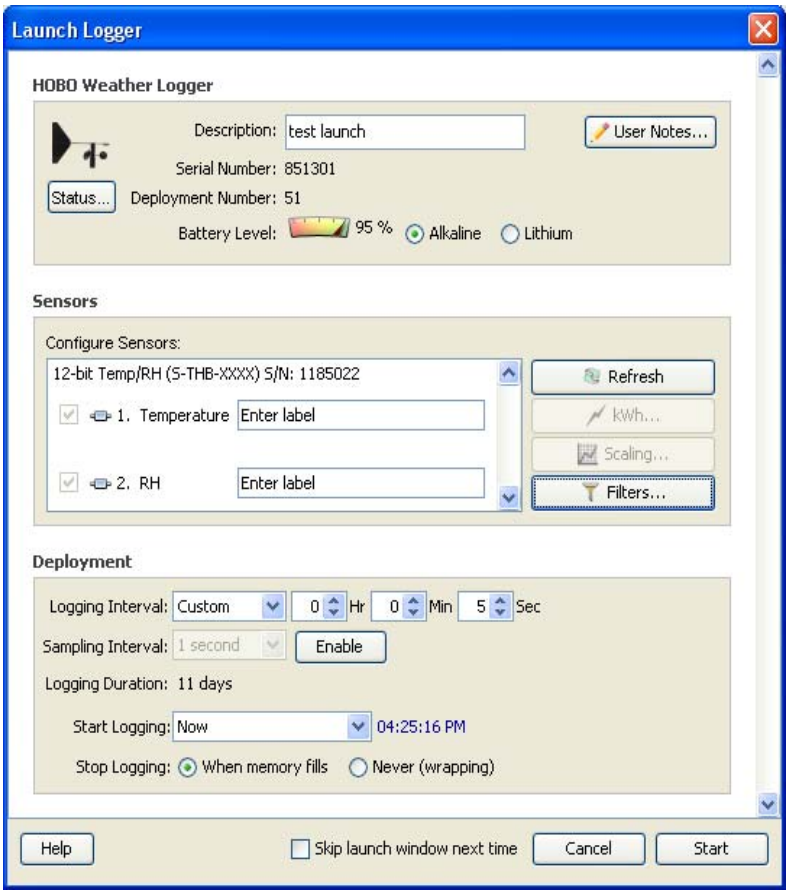
- **Logging Interval:** Select how often the logger will record data. You can choose either one of the preset logging intervals or specify a custom logging interval. The minimum logging interval is one second and the maximum for most loggers is 18 hours, 12 minutes, and 15 seconds. The shorter the logging interval, the more quickly memory fills and battery power is consumed. If you did not select any channels to log, this field will be disabled. See also Multiple Logging Intervals and Fast Logging Intervals.
- **Logging Duration:** This lists the approximate time it will take to fill the logger memory based on the logging interval and sensors currently selected. This is a theoretical estimate only; battery life and frequent state and event logging will affect your deployment. If you are logging only state changes and events, no estimation is possible.
- **Start Logging:** Select when to launch the logger. This defaults to the setting for the logger's previous launch. See Launch Time-Saving Options (HOBOware Pro). For U-Series loggers, you can choose to launch the logger:
    - Now. Logging begins as soon as you click the **Start** button.
    - At Interval. Logging will begin at an exact interval (for example 9:00:00 rather than 8:47:00 when you choose a one-hour logging interval). The exact start time depends on the logging interval you choose.
    - Push Button/Using Coupler. (Available only on certain loggers.) Logging will not start until you press the button on the logger and hold it down for at least three seconds, or return the logger to the coupler without the base station for at least three seconds (refer to your logger manual for more information). If the logger has a light, it will flash quickly when logging begins.
    - On Date/Time. Logging will begin at a date and time you specify, up to approximately six months from the present.

Skip launch window next time (HOBOware Pro)

Check this box if you would like to bypass the Launch Window the next time you choose Launch from the Device menu or click the Launch icon. This will cause the next logger to be launched with either the previous launch settings or the current logger settings as set in Launch Time-Saving Options preferences.

Launch Options for Station Loggers

The following launch options and settings are available for most Station loggers. Note that the Launch Logger window may vary from the example shown below. For details on the launch options available on other loggers, see Launch Options for U-Series Loggers and Launch Options for the HOBO 4-Channel Pulse Input Data Logger (UX120-017).



Logger Information

- **Description:** Enter a description for the launch, up to 40 characters, in this field. This description is used as the default file name when you read out and save the data recorded by the logger. It is also the default title of the plot.
- **Serial Number:** This is the serial number for the logger. Note that some external sensors also have serial numbers, which are listed in the Sensors pane.
- **Deployment Number:** This is the number of times (including this time) the logger has been launched. Each time you start a new launch, the deployment number increases by one.
- **Battery Level:** This shows the current battery level in the logger.
- **User Notes:** Click this button to type up to 2000 characters of information about the deployment. This text will be displayed in the Details pane after you read out the logger and plot the data.
- **Status:** Click the Status button to check the logger settings from the previous launch.

Sensors

Only the sensors that are currently plugged in or built into the logger are listed. Sensors are listed in ascending order by serial number, regardless of their physical position in the logger. If you add or remove sensors, click the Refresh button to make sure your changes are seen by the logger and displayed in this list.

You can assign a name to each sensor (up to 30 characters). This is helpful if you want to specify a location where the sensor will be placed or if you need to differentiate multiple sensors of the same type.

Sensors must be connected prior to launching if you will be entering a name for the sensor or configuring FlexSmart modules or Analog Sensor Ports (use the Configure button to the right of the Label field). Otherwise, sensors do not have to be connected when setting up the launch. You may set up the launch for a delayed or push button start, then connect the sensors later before logging begins.

Notes about configuring sensor channels:

- Do not attach more than 15 channels of sensors. The logger cannot accommodate more than 15 channels.
- In addition to logging up to 15 channels, the HOBO Energy Logger and HOBO U30 Station can record their internal battery channel (other sensors must be attached; the logger cannot log battery alone). The logger's battery voltage is recorded at each interval. However, logging the internal battery channel consumes some of the logger's memory. Unless you are using excitation power or suspect abnormal battery performance, you probably do not need to log the battery voltage in loggers other than the HOBO U30 Station.
- Always enable the logger's internal battery channel when logging with excitation power. This will help you determine whether and when excitation power was turned off during a deployment.
- HOBOware Pro Data Assistants let you create new data series by combining data recorded by the logger with additional data. When you use a Data Assistant from the Launch Logger window, the parameter set is saved and applied to data every time you read out a logger or open the resultant data file. The derived data is also shown when you check the latest readings in the Status window. You can use the following Data Assistants from the Launch window (others can only be used from the Plot Setup window): Pulse Scaling, Linear Scaling, and kWh. This feature is available for the HOBO U30, the HOBO H21 (Weather Station and Micro Station) and the HOBO H22 (Energy Logger) loggers. Click the kWh or Scaling button to access the Data Assistants window. Select the desired assistant and click the Create button to run the selected assistant. After you enter values, click Save. Sensors that support Data Assistants at launch time display the Scaling and/or kWh icon next to their name.
- Click the Filters button to create an additional filtered series, such as average temperature per day, automatically when you read out the logger and plot the data.

Deployment

- **Logging Interval:** Select how often the logger will record data. You can choose either one of the preset logging intervals or specify a custom logging interval. The minimum logging interval is one second and the maximum for most loggers is 18 hours, 12 minutes, and 15 seconds. The shorter the logging interval, the more quickly memory fills and battery power is consumed. Some sensors (specifically, the FlexSmart TRMS modules) require a logging interval of two seconds or greater. If you choose a faster logging interval, erroneous data will be logged on these channels.
- **Sampling Interval:** The sampling interval allows you to take multiple measurements within the logging interval, then average them together to create a single logged measurement. The sampling interval is optional and is valid only for sensors that support measurement averaging. Refer to the sensor's user manual to determine whether measurement averaging is available on the sensor. If you have at least one sensor that supports measurement averaging, click the Enable button, then set the sampling interval at less than or equal to the logging interval (up to four minutes). Rapid sampling (faster than one minute) will reduce the logger's battery life. If you do not have any sensors with measurement averaging or wish to turn off the sampling interval, click the Disable button.

- **Logging Duration:** This lists the approximate time it will take to fill the logger memory based on the logging interval and sensors currently selected. This is a theoretical estimate only; battery life and frequent state and event logging will affect your deployment. If you are logging only state changes and events, no estimation is possible. If you add or remove sensors while viewing the Launch window, click the Refresh button to get an updated Logging Duration.
- **Start Logging:** Select when to launch the logger. This defaults to the setting for the logger's previous launch. See Launch Time-Saving Options (HOBOware Pro). You can choose to launch the logger:
    - Now. Logging begins as soon as you click the **Start** button. If you do not have at least one sensor attached, the logger will not launch.
    - At Interval. Logging will begin at an exact interval (for example 9:00:00 rather than 8:47:00 when you choose a one-hour logging interval). The exact start time depends on the logging interval you choose.
    - Push Button. Logging will not start until you press the button on the logger and hold it down for at least three seconds. If the logger has a light, it will flash quickly when logging begins. This is not available for the U30 Station.
    - On Date/Time. Logging will begin at a date and time you specify, up to approximately six months from the present.
    - Save Settings in Logger. Logging will not start, but the launch settings will be saved so that you do not have to re-enter them when you are ready to launch at a later time. The next time you view the Launch window for this logger, the settings you entered will still be in place.
- **Stop Logging:** There are two options for stopping the logger: either "when memory fills" or "never (wrapping)." If you select "when memory fills," then the logger will stop recording data once the memory is full. If you select "never (wrapping)," the logger will record data continuously until either the logger battery runs out or you stop it. Once the logger is full, the newest data will overwrite the oldest data.

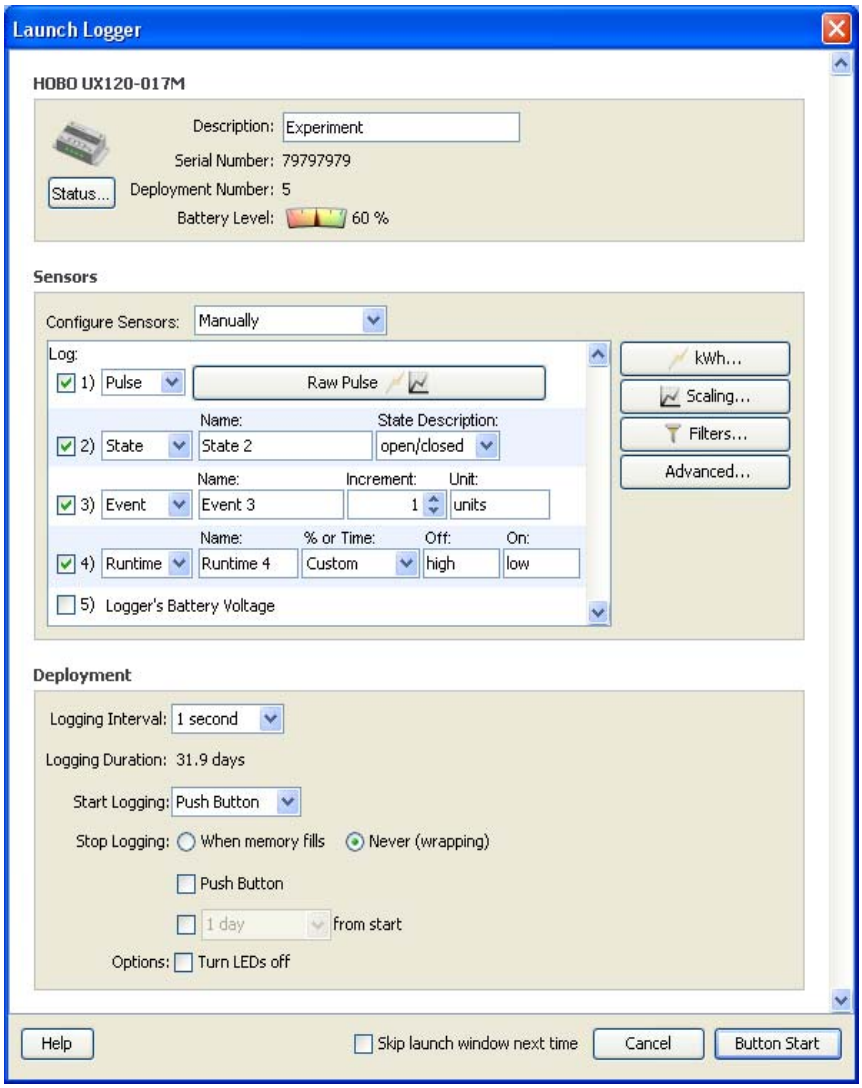
Skip launch window next time (HOBOware Pro)

Check this box if you would like to bypass the Launch Window the next time you choose Launch from the Device menu or click the Launch icon. This will cause the next logger to be launched with either the previous launch settings or the current logger settings as set in Launch Time-Saving Options preferences.

NOTE: For additional details on launching the HOBO U30 Station, see Working with the HOBO U30 Station.

Launch Options for the HOBO 4-Channel Pulse Input Data Logger (UX120-017x)

The following launch options and settings are available for the HOBO 4-Channel Pulse Input Data Logger (UX120-017x). Note that the Launch Logger window may vary from the example shown below. For details on the launch options available on other loggers, see Launch Options for Station Loggers and Launch Options for U-Series Loggers.



Logger Information

- **Description:** Enter a description for the launch, up to 40 characters, in this field. This description is used as the default file name when you read out and save the data recorded by the logger. It is also the default title of the plot.
- **Serial Number:** This is the serial number for the logger. Note that some external sensors or devices also have serial numbers, which are not listed here.
- **Deployment Number:** This is the number of times (including this time) the logger has been launched. Each time you start a new launch, the deployment number increases by one.
- **Battery Level:** This shows the current battery level in the logger.
- **Status:** Click the Status button to check the logger settings from the previous launch.

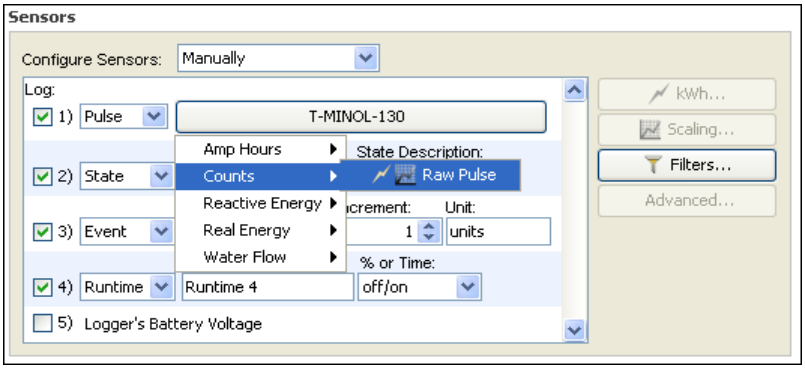
Sensors

The Sensors List displays all internal sensors and external channels available for recording data. Choose the sensors, or channels, that you wish to log in this deployment. To configure a channel:

1. If you are using the logger with an E50B2 Power & Energy Meter, then select "for E50B2 Power & Energy Meter" in the Configure Sensors drop-down list at the top of the Sensors pane. This will automatically preselect the appropriate channels and pulse scaling factors, which you can then customize further in the following steps.

   For all other sensors/devices, select "Manually" in the Configure Sensors drop-down list.

2. Make sure the checkbox is enabled for the external channel you wish to log.
3. Choose either Pulse, State, Event, or Runtime from the drop-down list.
4. For Pulse channels, click the button for the corresponding channel in the sensor list to select the sensor type as shown below. If you select Raw Pulse for the sensor type, you can use Data Assistants to set up kWh and pulse scaling information as necessary (HOBOware Pro only). You can also adjust maximum pulse frequency and lockout time by clicking the Advanced button. Note that sensors that support Data Assistants at launch time display the Scaling and/or kWh icon next to their name.



   For State channels, type a name and select the Open and Closed state descriptions.

   For Event channels, type a name, adjust the increment, and type a unit description (or accept the default "units" for the description).

   For Runtime channels, type a name and select the % or time Off/On descriptions.

5. Repeat steps 1 through 4 for each channel you wish to configure.

Notes on configuring sensors:

- Although it is helpful to see the connected sensors/devices when setting up the launch, it is not required that you physically connect them while selecting sensor type options. You may set up the launch for a delayed or push button start, then connect the sensors/devices later, before logging begins. **Important:** Sensors that are connected after logging begins may not log accurate data.
- Click the Filters button to create additional filtered series for any of the channels you configured. The filtered series will then be automatically calculated when you read out the logger and plot the data.
- You have the option to record the logger's battery voltage at each sample time; this is the last channel in the sensors list. Like the other data channels, logging the internal battery channel consumes some of the logger's memory. Unless you suspect abnormal battery performance, you do not need to log the battery voltage. This logger will record a bad battery event even if it is not logging the battery channel. You can also disable the battery channel in the Launch Time-Saving Preferences (HOBOware Pro).

Deployment

- **Logging Interval:** Select how often the logger will record data. You can choose either one of the preset logging intervals or specify a custom logging interval. The minimum logging interval is one second and the maximum for most loggers is 18 hours, 12 minutes, and 15 seconds. The shorter the logging interval, the more quickly memory fills and battery power is consumed. If you did not select any channels to log, this field will be disabled. See also Multiple Logging Intervals and Fast Logging Intervals.
- **Logging Duration:** This lists the approximate time it will take to fill the logger memory based on the logging interval and sensors currently selected. This is a theoretical estimate only; battery life and frequent state and event logging will affect your deployment. If you are logging only state changes and events, no estimation is possible.
- **Start Logging:** Select when to launch the logger. This defaults to the setting for the logger's previous launch. See Launch Time-Saving Options (HOBOware Pro). You can choose to launch this logger:
    - Now. Logging begins as soon as you click the **Start** button.
    - At Interval. Logging will begin at an exact interval (for example 9:00:00 rather than 8:47:00 when you choose a one-hour logging interval). The exact start time depends on the logging interval you choose.
    - Push Button. Logging will not start until you press the button on the logger and hold it down for at least three seconds. The Waiting LED will blink on the logger until you press the Start/Stop button.
    - On Date/Time. Logging will begin at a date and time you specify, up to approximately six months from the present. The Waiting LED will blink on the logger until logging begins on the selected date/time.
- **Stop logging:** Select when you want the logger to stop logging. You can choose:
    - When memory fills or Never (wrapping). If you select "When memory fills," then the logger will stop recording data once the memory is full. If you select "Never (wrapping)," the logger will record data continuously until either the logger battery runs out or you stop it. Once the logger is full, the newest data will overwrite the oldest data.
    - Push button. When this option is selected, the logger will stop recording data when you press the Start/Stop button on the logger itself for 3 seconds.
    - Specific stop date. Select the date you want the logger to stop recording data. Choose either a preset time or set your own custom date and time.
- **Options:** Select "Turn LEDs off" if you want the logger to operate in "stealth mode," which disables the Logging LED on the logger. The Waiting LED and the Test button/Activity lights will still remain operational when this option is selected.

Skip launch window next time (HOBOware Pro)

Check this box if you would like to bypass the Launch Window the next time you choose Launch from the Device menu or click the Launch icon. This will cause the next logger to be launched with either the previous launch settings or the current logger settings as set in Launch Time-Saving Options preferences.

Multiple Logging Intervals

Overview

Some loggers can be configured with multiple logging intervals, which allow you to define separate intervals for different phases of the deployment.

If multiple logging intervals are available for your logger, you will see an **Add New Interval button** on the **Launch** window for your logger.

Because internal logger events, such as coupler events, do take up some of the logger's memory, the number of samples and end times are only estimates. Frequent events will cause the logger to fill up sooner.

Steps

To configure multiple logging intervals:

1. Click the **Add New Interval** button until you have as many intervals as you want (up to the number of intervals available for the logger).
2. Set the hours, minutes, and seconds for each interval, and the number of samples you want the logger to record at each interval.
3. Use the **Start** and **End** times in the Duration column to help you decide how many samples to record at each interval.

To delete an interval, click the **Remove** button next to the interval.

Fast Logging Intervals

Some loggers can be configured with fast logging intervals, which allow you to log more than once per second, up to 100 measurements per second (hertz). If fast logging intervals are available for your logger, the **Launch** window for your logger will offer **Logging Interval** choices of **Normal** and **Fast**.

To use fast logging intervals, click the **Fast** button. Then choose a logging frequency from the **Hertz** drop-down list, or enter the logging interval in decimal form in the **Sec** field.

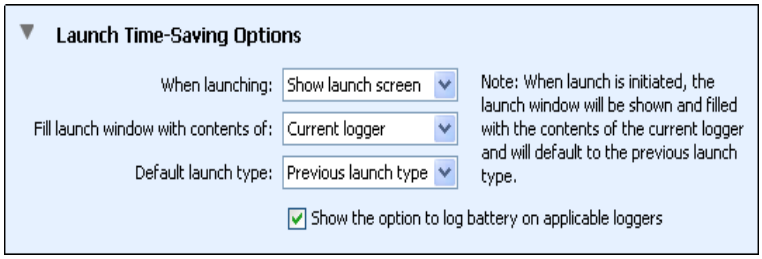
NOTES

- A logger cannot communicate with a computer or shuttle while it is logging at a fast interval. Once it has started logging, if you connect it to a computer, base station, or shuttle to check status or read it out, the logger will stop.
- Be aware that a fast logging interval typically means a very short **Logging Duration**. Make sure the logger will run long enough to collect the data you need. Disabling unnecessary channels will give you more time.
- Because fast logging deployments are so brief, the logger must be launched with a trigger start. Follow the instructions that came with your logger for a trigger (coupler or button) start. If the logger has a light, the light will flash quickly when logging begins.

Launch Time-Saving Options (HOBOware Pro Only)

Use the Launch Time-Saving Options to disable certain user interactions and save time when performing some launch functions.

You access the Launch Time-Saving Options by going to File > Preferences > General > Launch Time-Saving Options


Launch Time-Saving Options
When launching:
Show launch screen
Fill launch window with contents of:
Current logger
Default launch type:
Previous launch type
Note: When launch is initiated, the launch window will be shown and filled with the contents of the current logger and will default to the previous launch type.
Show the option to log battery on applicable loggers

When launching

- Show Launch Screen (default)

  HOBOware Pro displays the launch window when you initiate a launch.

- Automatically Launch

  Select this option if you want to skip the launch window and launch the logger with the default settings. This is particularly useful if you want to launch many loggers quickly without changing any settings. The default settings are determined by the *Fill launch window with contents of* setting.

  For HOBOware Pro Only: When used in conjunction with a Default Action of *Launch* (accessed from the Device menu), this feature allows you to launch many U-Series loggers in a row simply by plugging and unplugging individual loggers.

Fill launch window with contents of:

- Current logger

  A logger's memory contains the most recent launch settings for that logger. These settings normally become the defaults for the logger's next launch (the option).

- Previous launch

  Select this option if you plan to launch several loggers of the same model with similar settings. This will fill the launch window with the settings from the previous logger that was launched.

  This is particularly useful if you want to set up many loggers to start at the same time and with the same logging interval. An indicator on the **Launch** window will remind you when this preference is in use.

  If the logger you are launching is a different model from the previous logger, Previous launch does not apply. HOBOware Pro will use the settings in the logger's memory, and those values will become the default for the next logger if it is the same model.

Default launch type

This option allows you to set the default launch mode.

NOTE: If you set the Fill launch window with contents of preference to *Previous launch*, the Default launch type will be ignored in favor of the launch type from the last launch.

- Previous Launch type (default)

  The launch option will default to the option used for the logger's previous launch.

  Exception: if the previous launch was a Launch at interval start, the next launch will default to a delayed start.

- Launch now

- Launch at interval

- Delayed launch
- Triggered start

  Important: If you choose Triggered start as the default launch type, and then launch a logger that does not offer a trigger start option, the launch option will default to Launch now.

Show the option to log battery on applicable loggers

This setting controls whether you have the option to enable or disable the battery channel in the Launch Logger window when applicable. You can configure some loggers to record the battery voltage at every logging interval. When this option is selected, you can choose whether to record the battery voltage at launch time. If this setting is not selected, then you cannot record the battery voltage and it will not be shown in the Launch Logger window.

Repeating an Action on Multiple U-Series Devices

NOTE: This feature is only available with HOBOware Pro.

If you have many U-Series devices, the ***Default Action*** option on the **Device** menu may help you work more efficiently. The *Default Action* function can save you the most time when you are launching many loggers, especially if the loggers are the same model and will have similar launch settings.

NOTE: This feature is available only for U-Series devices.

Description

By default, HOBOware does not take any action when you connect a device. You can change the Default Action to Launch, Readout, or Get Status and HOBOware Pro will perform that action each time you connect a device.

For example, if you choose **Readout** and then you connect a logger, HOBOware Pro will read out that logger immediately. You can then disconnect that logger, connect another logger, and that logger will be read out automatically. If you connect a shuttle, the shuttle's new files will be offloaded automatically.

The **Default Action** only works when a single device is plugged in.

Steps

1. Set the **Default Action** to *Launch.*
2. Go to **Preferences** > **General** > **Launch Time-Saving Options**
3. Select the **Fill launch window with contents of** option.

Each time you connect a logger, the **Launch** window will open. If the logger is the same model as the last logger launched, the **Launch** window will be populated with the settings from the previous launch, and an indicator on the upper-right corner of the **Launch** window will remind you that the **Previous launch** preference is in use.

Important Note for Windows: The first time you connect a device the Default Action may not be triggered. After the device has been connected to the computer and disconnected at least once, the Default Action should be triggered.

"Read Header Failed" Error

Occasionally, when trying to launch, check status, or read out a U-Series logger (other than a HOBO U30 Station), HOBO Waterproof Shuttle, or HOBO U Shuttle, you may receive the following error: "Read Header Failed."

These messages occur when a device's header cannot be read, usually because of a communication error or corrupted header. Disconnect the device from the computer, then reconnect it and try to launch, check status, or read out again.

If you receive the message again, the header has probably become corrupted. The most common cause of header corruption is a communication problem during launch, such as the USB cable coming loose or an optical logger slipping out of its base station/coupler while the Launching Logger progress bar is displayed. In that case, there is a possibility that valid data has been logged, but cannot be read out.

You can restore the header by launching the logger or shuttle. This will reset the device's launch options to factory defaults. However, it will also cause any logged data or offloaded data from a shuttle to be lost. If you receive a "Read Header Failed" message and are unable to read out the logger or offload a shuttle, please contact the vendor that sold you the device. It may be possible to retrieve the logged data.

Launch Utilities

There are several utilities available from the Launch Logger window for setting up customized data series, configuring alarms, and setting advanced logger options. These utilities vary depending on the type of logger you are using. They include:

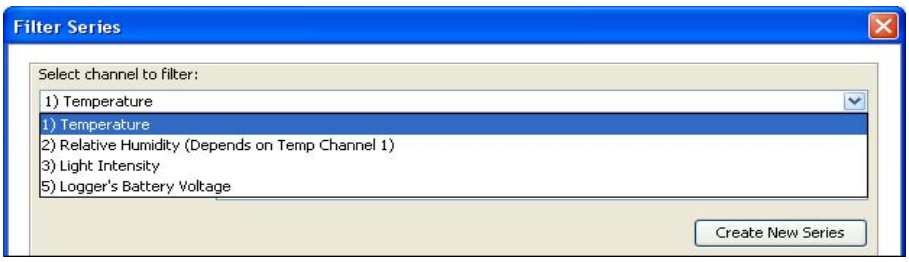
- Scaling
- Filters
- Alarms
- Advanced Sensor Properties

Filter Series at Launch

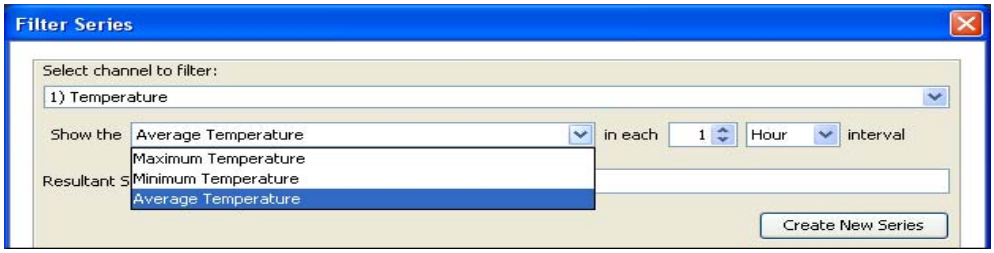
As part of the launch setup, you can create a filtered series that automatically calculates additional values, such as maximum, minimum, average, or total, for a set interval upon readout of the logger. The filtered series is saved as an additional series in the datafile so it is always available when plotting your data. This saves you the time of manually filtering data for each series after readout using the regular HOBOware filter tool, although this tool is still available should you need to further filter data later.

To set up a filtered series at launch:

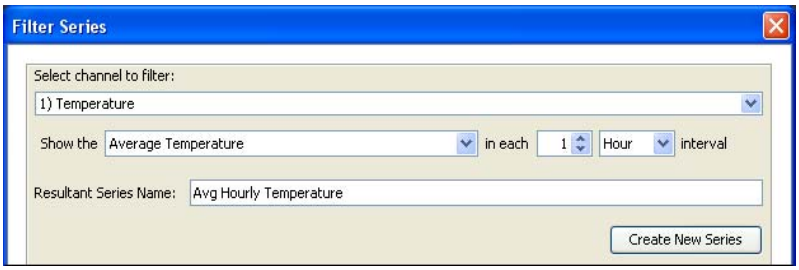
1. Select the channel, or sensor type, you wish to filter.



2. Select the type of filter and the interval you wish to use. In this example, the type of filter is "Average Temperature" in every hour. Filters vary depending on the channel's measurement type.



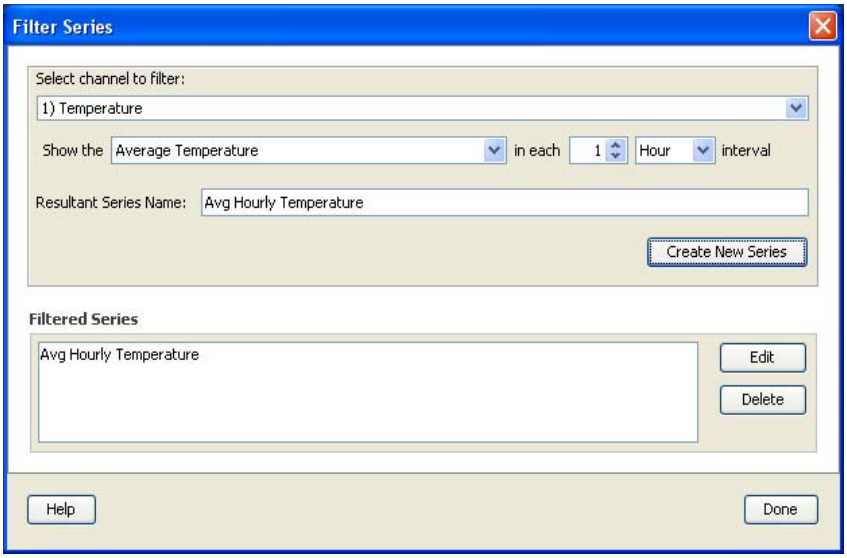
3. Edit the Resultant Series Name as desired and click **Create New Series**. In this example, the Resultant Series Name is edited to be "Avg Hourly Temperature."



4. The newly created series is added to the Filtered Series list as shown below.

   To make a change to a filtered series, either double-click the series name or select the series name and click **Edit**.

   To delete a filtered series, select the series name and click **Delete**.



5. Repeat steps 1 through 4 to create additional filtered series. Not only can you create filtered series for all channels, but you can also create multiple filtered series on a single channel (for example, you can show the maximum, minimum, and average temperature for a single temperature channel).
6. Click **Done** when finished. The number of filtered series that you created is displayed on the Filter button in the Logger Launch window.
7. After you launch the logger and read it out, the filtered series will automatically be listed in the Plot Setup dialog, from which you can select the series you wish to plot. **Note:** If you change the GMT offset for the filtered series, the data points will not reflect that change. They will continue to be filtered based on times within the original GMT offset at launch.

Note: Loggers launched in HOBOware 3.2 with series created by the Pulse Scaling, Linear Scaling, and kWh Data Assistants or with filtered series cannot be read out in earlier versions of HOBOware.

Data Assistants Window (Scaling)

When you run a Data Assistant from the Launch Logger window, you can create a derived series, which is an additional data series automatically calculated each time you read out the logger. The Data Assistants window lists only those assistants available for the currently selected sensor and logger at launch time. There may be other Data Assistants available for use after reading out the logger.

To set up a derived series with a Data Assistant:

1. Select the Data Assistant you wish to use and click **Create**.
2. Select the information, or parameters, you want the series to contain and click **Save.**
3. The new series appears in the My Derived Series list. Create additional series as desired.

   To make a change to a derived series, either double-click the derived series name or select it and then click **Edit**.

   To delete a derived series, select the series and then click **Delete**.

4. After you have finished creating or editing the derived series, click **Done**. Depending on the type of logger you are using, the total number of derived series created appears on the kWh and/or Scaling buttons in the Launch window. Derived series are also listed in the Status window.

After you launch the logger and read it out, the derived series will automatically be listed in the Plot Setup dialog, from which you can select the series you wish to plot.

Note: Loggers launched in HOBOware 3.2 with series created by the Pulse Scaling, Linear Scaling, and kWh Data Assistants or with filtered series cannot be read out in earlier versions of HOBOware.

Configuring Alarms

HOBOware can be used to configure alarms for the following loggers:

- HOBO Temperature/Alarm Data Logger (model UA-001)
- HOBO U14 LCD Logger
- HOBO U30 Station

If alarms are available for your logger, you will see an **Alarms** button on the **Launch** window. Click the button to access the Alarms window.

Built-in alarm indicators are triggered when data is logged above or below values that you define. You can set up alarms to be triggered when the data has been above or below an allowed value for a specified amount of time, or when the data has been logged above or below an allowed value for a specified number of times throughout the deployment.

For details on configuring alarms for the HOBO Temperature/Alarm Data Logger, see The Alarms Window topic.

For details on configuring alarms for other loggers, see the logger's user manual.

Alarm and Readout Tool

If you have a HOBOware-compatible logger without built-in alarm capability, you can use Onset's Alarm & Readout Tool to monitor loggers for alarm conditions. When alarms are tripped, the software notifies you by e-mail, mobile phone text message, or pager.

For more information, see: http://www.onsetcomp.com/products/software/bhw-t-alrm

The Alarms Window for the HOBO Temperature/Alarm Logger

This topic documents the Alarms window for the HOBO Temperature/Alarm Data Logger (model UA-001). For other loggers, see the logger's user manual for details about alarms.

Description

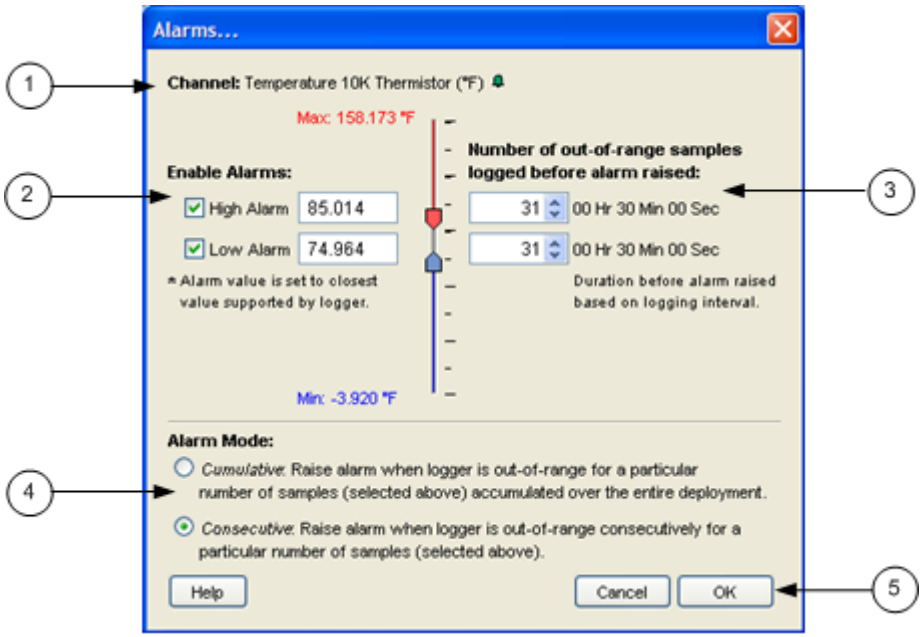
Use the Alarm feature to flash a warning on the LCD if monitored sensor falls outside user-selectable limits. If the reading measured by the logger falls outside the selected high or low limit, the word *Alert*, an alert symbol, and the reading that went out of limits will flash.

If you require remote or secondary notification of an alarm condition, you can connect a remote audio alarm and/or an Automatic Dialer to the contact closure.

You access the **Alarms** window from the **Launch** window.

Also see Configuring Alarms 43.

Alarms Window


Alarms...
1
Channel: Temperature 10K Thermistor (°F)
Max: 158.173 °F
Enable Alarms:
2
High Alarm 85.014
Low Alarm 74.964
* Alarm value is set to closest value supported by logger.
Number of out-of-range samples logged before alarm raised:
3
31 00 Hr 30 Min 00 Sec
31 00 Hr 30 Min 00 Sec
Duration before alarm raised based on logging interval.
Min: -3.920 °F
Alarm Mode:
4
Cumulative: Raise alarm when logger is out-of-range for a particular number of samples (selected above) accumulated over the entire deployment.
Consecutive: Raise alarm when logger is out-of-range consecutively for a particular number of samples (selected above).
Help
Cancel
OK
5

1. Channel

   Indicates the channel.

2. Enable Alarms

   Select the check box for the High Alarm and/or the Low Alarm. Enter a value to define the alarm threshold. You can enter a value in the box or use the sliders. (If you enter values manually, the software may adjust them slightly to the nearest values compatible with the logger.)

3. Samples

   Enter the number of samples that are needed to trigger each alarm.

4. Alarm Mode

   Cumulative - alarm will be triggered after a specific number of samples have been logged above or below an allowed value, even if the samples are not logged consecutively.

Consecutive - alarm will be triggered only when the value has been above or below an allowed value for a specific amount of time. If the value goes back in range before triggering the alarm, the count is reset.

5. OK - Click OK when done.

Configuring Alarms for the HOBO Temperature/Alarm Data

The following procedure is for configuring alarms for the HOBO Temperature/Alarm Data Logger.

For U14 or U30 alarm configuration, see the logger's user manual.

Steps

To set up the alarms:

1. From the **Launch** window, select a channel that can be configured with alarms (it will have a small bell icon next to it) and click the **Alarms** button to access the Alarm window.
2. Select the **High Alarm** and/or **Low Alarm**. Use the sliders to set the values that will trigger the high and low alarms, or enter the values manually. (If you enter values manually, the software may adjust them slightly to the nearest values compatible with the logger.)
3. In the **Number of out-of-range samples logged before alarm raised** fields, enter the number of samples that are needed to trigger each alarm.
4. Select an alarm mode:
   - Choose **Cumulative** if you want the alarm to be triggered after a specific number of samples have been logged above or below an allowed value, even if the samples are not logged consecutively.
   - Choose **Consecutive** if you want the alarm to be triggered only when the value has been above or below an allowed value for a specific amount of time. If the value goes back in range before triggering the alarm, the count is reset.
6. Click **OK** to return to the Launch window and proceed as usual. The small bell icon will now be colored green to indicate that the alarm has been set. Refer to the logger's manual for information about how the logger responds when the alarm is triggered.

Advanced Sensor Properties

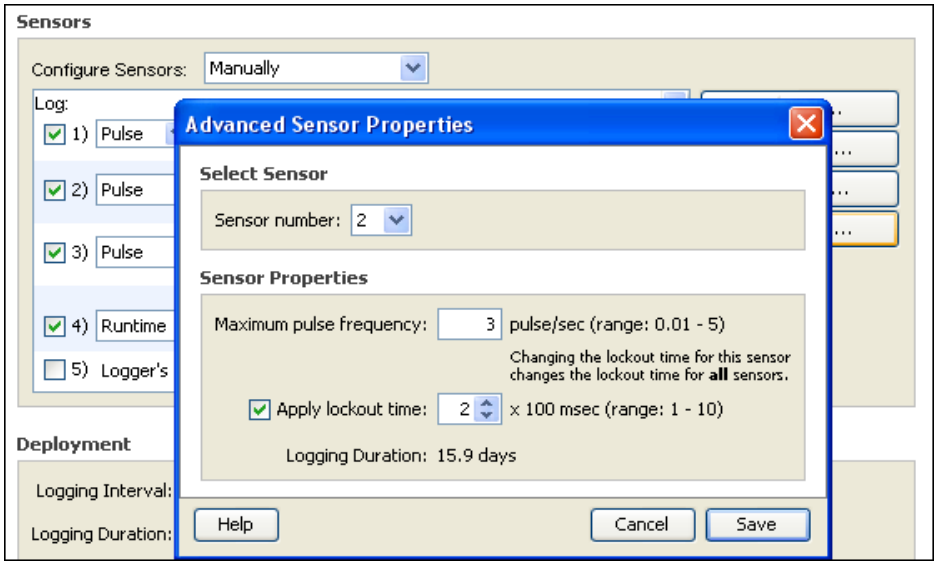
Use the Advanced Sensor Properties dialog to set the maximum pulse frequency for raw pulse channels. You can also set a lockout time for event channels and generic pulse channels, which prevents false readings from mechanical sensors as their relay state changes.

Setting maximum pulse frequency is not required, but it can help optimize logging duration. The maximum pulse frequency, multiplied by the logging interval, determines the maximum count of pulses possible within each interval. The logger then can use this value to adjust the amount of memory (bits) used to log each data point. This means the logger uses memory as efficiently as possible, which in turn maximizes logging duration.

The default maximum pulse frequency is 120 Hz. When lockout time is not enabled, the range is 0.01 to 120. Lockout time affects the maximum pulse frequency: the higher the lockout time, the lower the maximum pulse frequency. As you enter lockout time values (from 1 to 10), the available range for the maximum pulse frequency is automatically recalculated.

To configure maximum pulse frequency and lockout time:

1. Select the sensor, or data channel, number that corresponds with the pulse channel you wish to configure. In the example below, the sensor number selected is 2, which corresponds with the second pulse channel in the Launch Logger window sensors list.



2. Set the maximum pulse frequency, which controls how many pulses per second can be processed by the logger on a single pulse channel. Refer to the specifications in your sensor or device documentation for recommended maximum pulse frequency values. In general, the larger the maximum pulse frequency, the shorter the logging duration will be for the deployment. The maximum pulse frequency is 120 if no lockout time has been selected. Otherwise, the maximum pulse frequency will decrease depending on the lockout time rate that you select. In the example above, the lockout time was set to 2, which results in a potential range of 0.01 to 5 Hz for the maximum pulse frequency. Note that, if the sensor generates more pulses than the configuration allows, the data reading will show the maximum pulse count possible for that bit size. For example, a bit size of 8 means the maximum pulse count is 254. The following table shows the maximum pulse count allowed for various bit sizes.

Memory Size (bits)	Maximum Pulse Count = Frequency * Logging Interval (in seconds)
4	14
8	254
12	4,094
16	65,534
20	1,048,576
24	16,777,214

The option to set the maximum pulse frequency is only available for raw pulse channels (sensors for which you have selected Pulse > Counts > Raw Pulse as the sensor type in the Launch Logger window).

3. Click the "Apply lockout time" checkbox if you wish to specify a time period (up to 1 second) when pulses will be ignored. Lockout time is calculated at a rate of 1 to 10 (with a default of 5) x 100

milliseconds, which equals 0.1 to 1 second). Lockout time is a global setting. If you set the lockout time for one sensor, then all sensors will have the same lockout time. This means if you are using sensors with different lockout time requirements, this may result in lost pulses or false pulses. To disable lockout time, deselect the "Apply lockout time" checkbox. Note that lockout time is only available for raw pulse channels and event channels.

4. Click OK to save the settings. Note that the selections will not take effect in the logger until you launch it.

Checking Device Status

The Status window displays real-time information about the attached logger, including:

- state of the logger
- time logging will begin
- current readings
- logger memory used

You can check the status for a logger whether it is waiting for logging to begin, actively logging (unless it is logging at a fast logging interval), or stopped.

NOTE (HOBOware Pro): When a Station logger is logging, HOBOware can only display the last sample taken by the logger, at the last interval.

Important: Battery power is drained more rapidly while checking status. Keep this in mind when frequently checking status during a deployment. You can significantly reduce the demand on the battery by adjusting the **Screen Refresh Interval** to five seconds or higher (not available on all loggers).

Steps

To check the status of a logger:

1. Connect the logger to the computer.
2. Click the Status icon on the toolbar, or choose **Status** from the Device menu.

   You can also access the Status window by clicking the **Status** button on the Launch window.

The Status Window

The Status window displays the current status of the logger. If you clicked Status from the Launch Logger window, then details from the previous launch is displayed.

The Status window is divided into the following panes:

- Device Identification, which lists the device name and model number, description entered when the logger was last launched (which is also used as the default file name and title in the plot), serial number, and firmware number.
- Device Details, which includes the battery level, how much memory has been used, the date and time the device was last launched, the deployment number, current status, and current state (if applicable).
- Current Readings, which lists the latest readings for attached sensors, and where you can set the refresh rate.

A Contact HOBOlink button also appears at the bottom of the Status window for the HOBO U30 Station only. Click this button when you want the HOBO U30 Station to connect to HOBOlink. When you click Contact HOBOlink, a confirmation message is displayed. Once you click Yes, the Status screen will close and then the HOBO U30 Station will attempt to connect to HOBOlink within 30 seconds. A warning may appear in the event that a live connection with HOBOlink is already underway.

Device Details

This topic describes the elements of the Device Details section of the Status window.

Battery Level/Battery State

Condition of the battery. Consult the logger documentation for specifics on battery capacity.

Memory Used

Percentage of the logger's memory that is full.

Note: If the battery died while the logger was logging, this will be 100% even if only a small amount of the memory was used.

Stops Logging

For some loggers, displays when the logger will stop logging.

Last Launched

Date, time, and offset to Greenwich Mean Time (GMT), also known as Coordinated Universal Time (UTC), when the logger was last launched. This is not necessarily the time when the first sample was recorded; it is the time all of the launch parameters were loaded in the logger.

Delayed Start (if applicable)

If the logger has been launched, but is waiting for a delayed or interval start, the scheduled start time is shown here in local time.

Deployment Number

Number of times the logger has been launched. The number listed includes the most recent launch.

Logging Interval

Rate at which the logger was set up to record data the last time the logger was launched, if applicable. If multiple logging intervals are available for your logger, the interval currently in use (if the logger is logging) will be shown in bold.

Sampling Interval (HOBOware Pro only)

For station loggers only, this is the sampling interval that was entered the last time the logger was launched, if applicable.

Current Status

Messages that describe the state of the logger.

For the HOBO U30 Station (HOBOware Pro only) the current state of the relay is also noted. After the state of the logger, the message "Relay is open" or "Relay is closed" will display.

- **Awaiting Button/Coupler Start**
  The logger has been launched with a trigger start (if available). Press and hold down the button on the logger for three seconds to begin logging, or follow the instructions that came with your logger if it offers a triggered start but does not have a button. If the logger has a light, the light will flash quickly when logging begins.

- **Awaiting Delayed Start**
  The logger will begin recording data at a specific time because either **Delayed Start** or **Start at Interval** was chosen at launch.
- **Launched, Logging**
  The logger has been launched and is actively recording data.
- **Logger Is Full**
  The logger has reached its memory capacity and is no longer recording data.
- **Logger is stopped**
  The logger is not logging, is not full, and is not awaiting a delayed or trigger start.
- **On Hold for Later Launch** (HOBOware Pro only)
  The logger has been launched with a Save Settings start (if available). Logging is not scheduled to begin, but the launch settings have been entered and saved.

Current States (U-Series loggers except the U30)

If your logger has an event button, most often the current state will be **Button Up,** meaning the button is not being pressed.

Current Readings

This topic describes the elements of the Current Readings section of the Status window.

Screen Refresh Interval

Frequency with which the Current Readings are updated, up to 3600 seconds (one hour). A higher number means less stress on the logger's battery. The Status icon blinks when the readings are updated.

Tilt meters (not labeled)

For acceleration loggers only, color-coded meters display X, Y, and Z-axis tilt (relative to vertical, assuming that the only acceleration force on the logger is gravity) graphically.

Sensor Readings

Sensor readings, updated in real time.

NOTES

- Readings are displayed for all available sensors, even if they are not being logged. If a channel is not being logged, its name is dimmed in the display.
- If a logger has channels for external sensors, a description and reading will be given for the external channels even if no sensors are plugged in.
- If a U-Series logger (other than a HOBO U30 Station) has channels for external sensors, a description and reading will be given for the external channels even if no sensors are plugged in.
- For event loggers, the event count in the Current Readings box will always start at zero, even if many events have already been logged.
- (HOBOware Pro) For station loggers, the location (if defined) is displayed next to the reading.
- (HOBOware Pro) If a HOBO U30 Station has an Analog Sensor Port, readings for one or both channels are displayed.
- (HOBOware Pro) The RSSI (Signal Level) is displayed for the HOBO U30/GSM Station. This helps you determine if there is enough signal strength in the current location for the HOBO U30 Station to contact a cellular tower for connecting with HOBOlink. Signal level is measured on a scale of 0 to 10, with 0 being no signal, 1 being a weak signal, and 10 being a strong signal.

- The battery voltage is displayed for some loggers.

Stopping a Device

A logger automatically stops recording data when the memory is full (unless it has been configured to never stop logging) or when the battery runs down.

You can also stop the logger manually at any time with the stop command.

To stop a logger:

1. Connect the logger to the computer.
2. Click the Stop icon on the toolbar, or choose **Stop** from the Device menu.

After the logger has been stopped, the data remains in the logger until the next launch.

Chapter 3: Plotting and Analyzing Data

After a logger has recorded data, you can then do the following:

- Read out the data from the logger
- Plot the data
- Modify the plot if desired
- Analyze the data
- Export the data

Reading Out Data from a Logger

To retrieve data recorded by a logger, you must read out the logger. Reading out the logger copies data from the logger to your computer, allowing you to save the data in a datafile and view the plot. During readout, the logger continues to record data unless you have stopped the logger or the logger is full.

You can also read out many logger types to a shuttle and then offload the datafiles from the shuttle to your computer. See Offload Files from a Shuttle for more details.

To read out a logger:

1. Connect the logger to the computer.
2. Click the Readout icon on the toolbar, or choose **Readout** from the Device menu. If the logger is still logging, a message asks whether you want to stop the logger. Click either Don't Stop or Stop as desired.
3. A progress bar displays while the data is being read out. Once the readout is complete, choose a location and/or a new filename or accept the default location and name to save the data (the default location is the My Documents directory on Windows or Documents on Mac). Click **Save**. The datafile has the following extension:

   HOBOware Lite:

   - Most U-Series loggers: .hobo

   HOBOware Pro

   - Most U-Series loggers: .hobo or .hsec
   - Station loggers: .dtf or .dsec

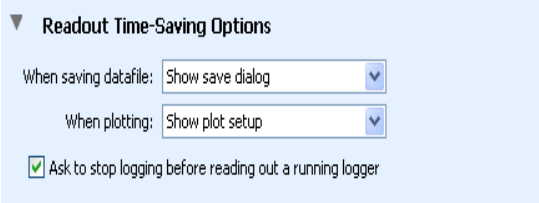
   If you save the file to a different folder, that folder will be the new default save location for future readouts.
4. After saving the data, select the data channels and/or events you wish to display in a graph and click Plot. See the Plot Setup window for more details on the options available.

Note: You can read out the HOBO 4-Channel Pulse Input Data Logger (UX120-017) even if the batteries are bad. In this case, a warning appears before the readout begins indicating the battery is very low and that you may experience communications problems. The readout is able to continue as normal despite the low battery because this logger can be powered by a USB cable. Once the readout is complete, be sure to replace the batteries as suggested.

Readout Time-Saving Options

Use the Readout Time-Saving Preferences to disable certain user interaction that will make it easier to perform readout functions such as saving datafiles and plotting data.

You access the Readout Time-Saving Options by going to File > Preferences > General > Readout Time-Saving Options


Readout Time-Saving Options
When saving datafile:
Show save dialog
When plotting:
Show plot setup
Ask to stop logging before reading out a running logger

- **When saving datafile**

  Show save window(default)

  HOBOware Pro displays a Save window after you read out a file. This allows you to specify a location and name for the file, or decline to save the file.

  Automatically save

  Select this option if you want to skip the Save window. The file will be saved automatically with a default name (based on the launch description) and in the default location.

- When plotting

  Show plot setup (default)

  After reading out a logger and being prompted to save the datafile, HOBOware Pro displays the Plot Setup window.

  Automatically plot

  Select this option to bypass the Plot Setup window (including Data Assistants) and plot automatically

  Do not plot

  Choose this option to skip the Plot Setup window without displaying the plot. This is useful if you are reading out many loggers now and prefer to look at the plots later.

- **Ask to stop logging before reading out a running logger**

  A prompt appears every time you read out a logger that is logging, asking whether you want to stop the logger or let it continue logging data during readout.

  If you disable this option, the logger will always continue logging during readout.

Reading out Multiple Loggers

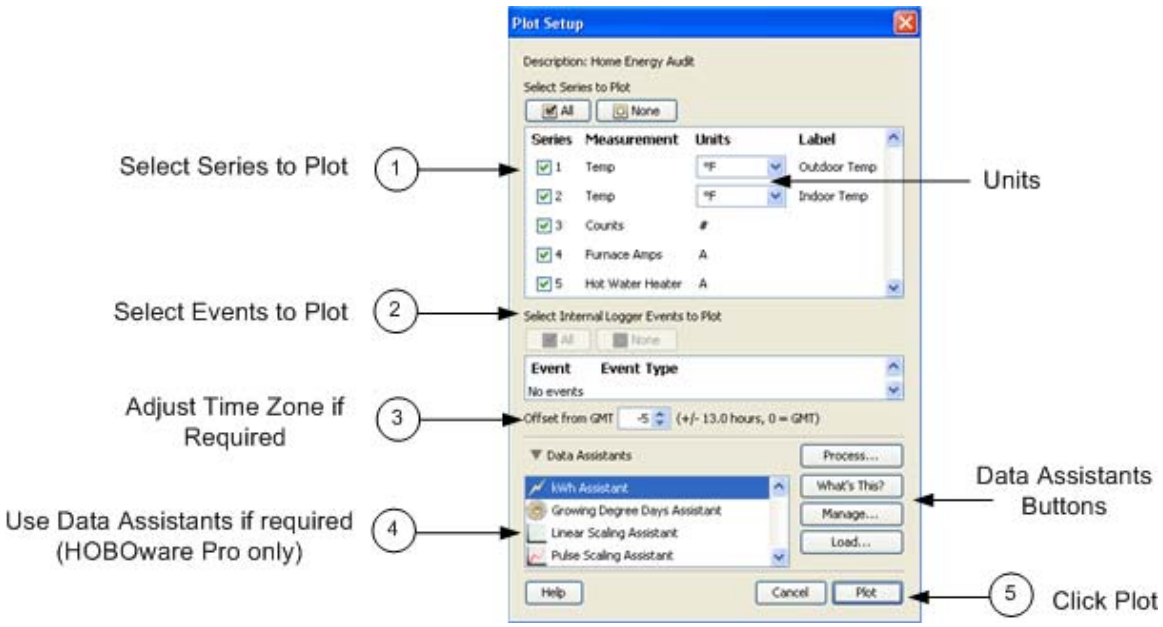
When used in conjunction with a Default Action of Readout, the Readout Time-Saving Options allow you to read out many U-Series loggers in a row simply by plugging and unplugging individual loggers. To do this, set these options as follows:

- When saving datafile: Automatically save
- When plotting: Do not plot
- Ask to stop logging...: Disabled (unchecked)

Then, from the Device menu, choose a Default Action of Readout. (The Default Action will reset to Do Nothing the next time you start HOBOware Pro.)

Setting up a Plot

After you read out a logger, the **Plot Setup** window appears. Follow this procedure to set up a plot.



Steps

1. Select the series you wish to view on the plot.

   Click each checkbox individually to select or clear sensor measurements, states, and events, or click the **All** or **None** buttons to select or clear all sensor measurements, states, and events.

   Select the units you want to display for each series, if available.

2. Select Internal Events to plot, if applicable for your logger.
3. Adjust the time zone offset, if necessary.

   By default, data is shown in the offset used to launch the logger with HOBOware (not a shuttle). To select a different offset, enter the hours offset from GMT (UTC) in decimal form. You may find this useful if you logged in multiple time zones, or if you took the logger to a different time zone after launching it.

4. HOBOware Pro Only: If data assistants are available, you can use them to create additional series. Select an assistant from the list and click **Process**.
5. When you have made your selections, click the P**lot** button.

The plot is displayed.

Data Types in Plots

Four kinds of data can be displayed on a plot:

Sensor measurements

Sensor measurements include the channels you selected to log at an interval during the launch, such as temperature, RH, or battery voltage. This type of data series consists of all the logged data points for that channel. In addition, if the logger recorded both temperature and RH, a dew point series can be plotted.

States

States are condition changes that can be recorded at any time during deployment, regardless of the logging interval (if any). Only state loggers, such as the U9 and U11, can record state changes.

External Events

External Events are momentary switch closures (e.g., from turnstiles) that are recorded by loggers with external event channels, such as the U11 logger.

Internal logger Events

Internal Logger Events are individually logged occurrences that can be recorded at any time during deployment, regardless of the logging interval. U-Series loggers (Other than the HOBO U30 Station) record internal logger events.

Examples of internal logger events include:

- **End of File:** Marks the last record that was found in the logger.
- **Bad Battery:** Time the battery capacity fell to an extremely low level (if applicable). If you see a Bad Battery event, replace the battery before deploying the logger again.
- **Stopped:** Time the logger was manually stopped with HOBOware.
- **Host Connected:** Time the logger was connected to the computer.
- **Coupler Connected/Coupler Disconnected:** Time the logger was connected or disconnected from the coupler, if the logger uses a coupler to communicate with the computer.
- **Button Down/Button Up:** For U-Series loggers that have event buttons, each button push of at least one second is logged as a Button Down event and a Button Up event.
- **Interval Change:** For loggers that can be configured with multiple logging intervals, an Interval Change event marks the moment when a new logging interval began.

Opening Files

The following files can be opened by HOBOware Pro:

- .hobo - Including files created with Onset's GreenLine software and both Macintosh and Windows - compatible versions of HOBOware Lite and HOBOware Pro.
- .hsec - Secure files (21 CFR Part 11 Conformance) for U-Series loggers.
- .hproj - HOBOware Project.
- .dtf - Files with an extension of .dtf must come from a HOBO U30 Station, Weather Station, Micro Station, or Energy Logger. Other .dtf files are not compatible with HOBOware Pro.
- .dsec - Secure Files (21 CFR Part 11 Conformance) for Station loggers.
- .txt/.csv - .txt or .csv files, as well as most ASCII files, can be imported.

Steps

To open a file:

From Windows Desktop or Mac Finder

Double-click a compatible file. HOBOware automatically launches itself (if it is not open already) and opens the file.

From HOBOware

Click the Open icon on the toolbar, or choose *Open Datafile* from the **File** menu. Select a file or multiple files and click **Open**.

If verification fails, see Verification Failure in the Working in Secure Mode topic (page 102).

Complete the Plot Setup window to select the items you wish to view in the plot. Then click the **Plot** button. The plot is displayed. If you selected multiple files, you will be prompted with a Plot Setup window for each file.

Tip: If you never use data assistants or change time zones, and would like to bypass the Plot Setup window every time you open a datafile, go to **Preferences** > **General** > **Open File Time-Saving Options** and select *When opening a datafile: Automatically plot*. This displays the plot with default Plot Setup selections.

Project Files

To open a project file, choose **Open Project** from the File menu. Then select a project (.hproj) file and click **Open**.

Click the **File** menu and select a recently opened datafile or project file from the **Recent Files** list.

Opening Files from Unsupported Loggers

Although the following loggers cannot be launched or readout using HOBOware, data files from these loggers can be opened and plotted by HOBOware Pro and HOBOware Lite. All graphing tools, filters, and Data Assistants can be used with the files and data can be exported to text and XML project files.

H08 (8-bit)

- H08-001-04
- H08-002-04
- H08-003-04
- H08-004-04
- H08-006-04
- H08-008-04

TBI/WTA

- TBI32-05+37
- TBI32-20+50
- WTA08-05+37
- WTA08-39+75
- WTA32-05+37
- WTA32-39+75

H08 (12-bit)

- H08-030-08
- H08-031-08
- H08-032-08

H20

- H20-001

H06

- H06-001-02
- H06-002-02
- H06-003-02
- H06-004-02

H07

- H07-001-02
- H07-001-04

H14

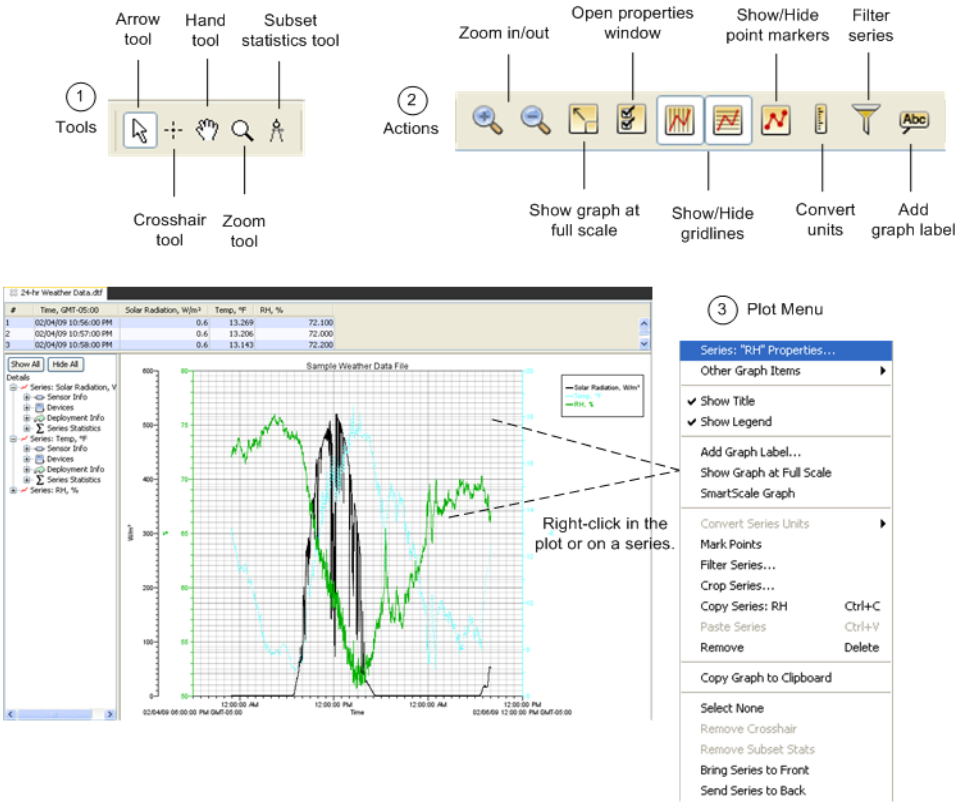
- H14-001
- H14-002

H12

- H12-001
- H12-002
- H12-003

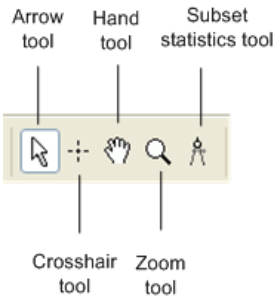
Modifying a Plot

This topic covers the ways in which you can modify a plot using the Tool Bar and the Plot menu.



1. Tools

Use the tools in the tool bar to perform a number of operations on the plot.

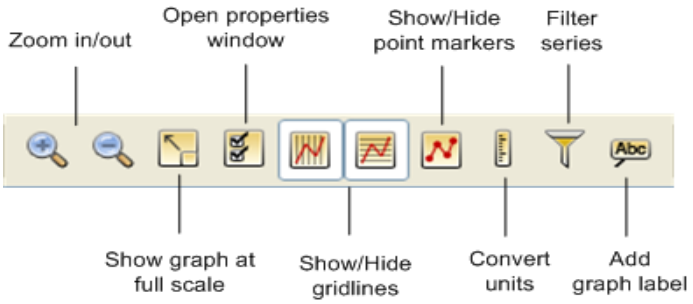


- Use the Arrow tool to point to and select items on the graph to edit their properties
- Use the Crosshair tool to zero in on a specific date and time in the plot and any data points associated with that date and time.
- Use the Hand tool to move different areas of the graph into view or adjust the position of one series so it can be viewed more easily. This is particularly useful when you are zoomed into the graph and want to see another section of the graph without zooming out and then zooming back in on the new location.
- Use the Zoom tool to focus on one area of the graph, allowing you to see more detail.

- Use the Subset Statistics tool to view statistics for a particular time span.

2. Actions

Use the Actions buttons to perform a number of actions on a plot or a series.



Click the **Open properties** icon to open the properties window for the plot element that is currently selected (such as gridlines, legend, axis).

Use the **Gridline** icons to toggle all horizontal or all vertical gridlines on and off.

You can also toggle gridlines on and off for each axis individually. Using the arrow tool, double-click an axis to get the Axis Properties window. Check the Show Gridlines box to display gridlines for that axis, or clear the Show Gridlines box to hide the gridlines.

Click the **Convert units** icon to open the Convert Plot window, which allows you to convert some or all of the series on the currently focused plot to other units (for example, from degrees Fahrenheit to degrees Celsius).

Click the **Filter series** icon to open the Filter Series window. See Filtering a Series on a page 74 for information.

Click the **Add Graph Label** button to label a graph.

3. Plot Menu

Right-click a series or an empty area in the plot to open a menu of options for modifying the series or plot. Available options depend on whether you click on a series or an empty area of the plot.

NOTE: You can also access these options in the View and Edit menus from the main menu.

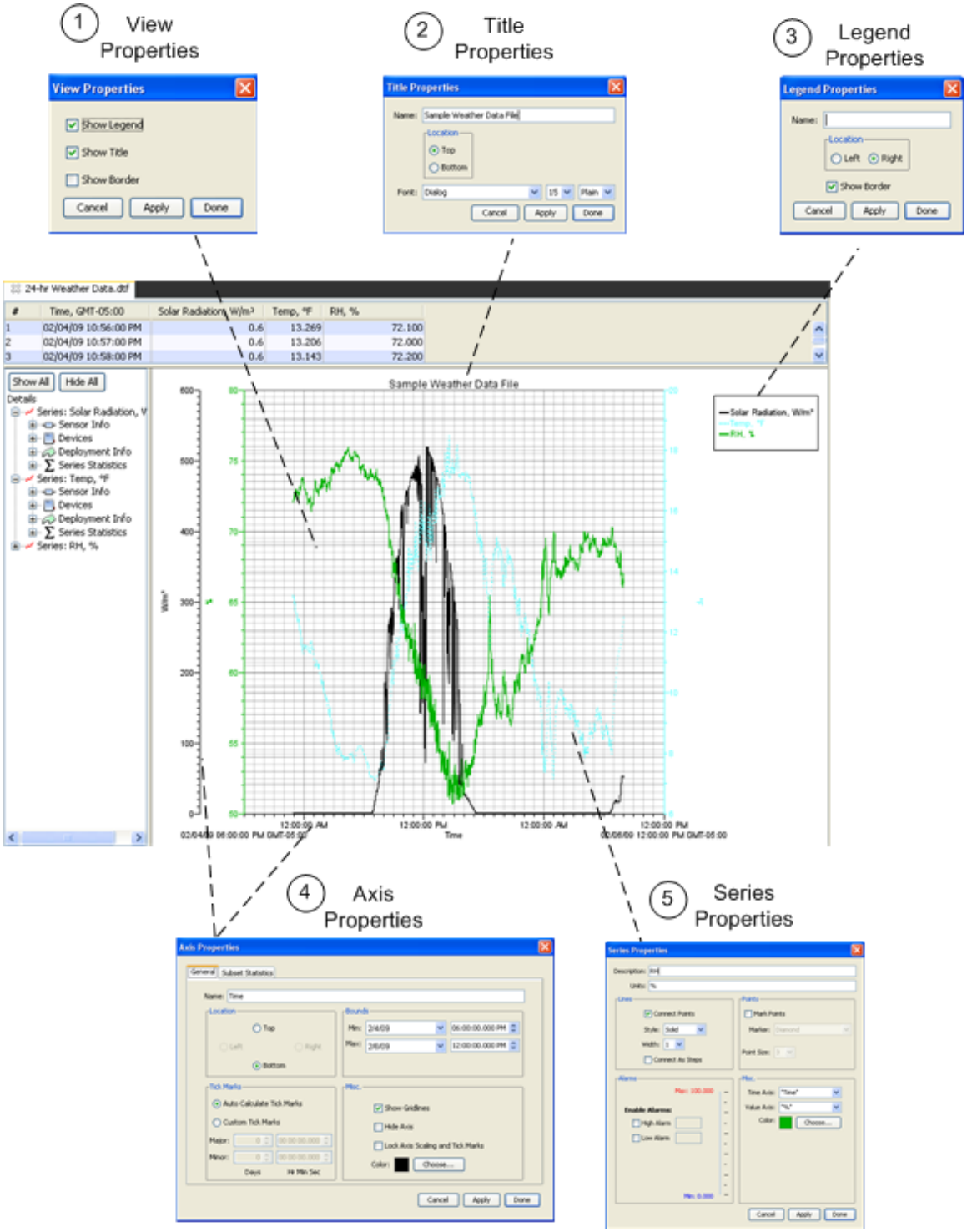
To move a series to the front or back, select the series, right-click and select either Bring Series to Front or Send Series to Back. This is helpful if one series is hidden behind another. It also changes the order of series in the Details pane, Points table, and the legend.

NOTE: After you adjust the order of the series for optimal viewing, copy the graph as a bitmap to paste into other programs, such as Microsoft Word or PowerPoint®.

Setting Series and Plot Properties

This topic covers some of the ways you can modify a plot or a series using properties.

To change properties for all plots, see Setting Properties for all Plots on page 60.



1. View Properties

Double-click in an empty area of the plot to open the View Properties window, where you can show or hide the legend, plot title, and borders.

2. Title Properties

Double-click the Plot Title to open the Title Properties window, where you can change the title name, location, and font.

3. Legend Properties

Double-click the legend to open the Legend Properties window, where you can add a label to the legend, change its position, and show or hide the border.

4. Series Properties

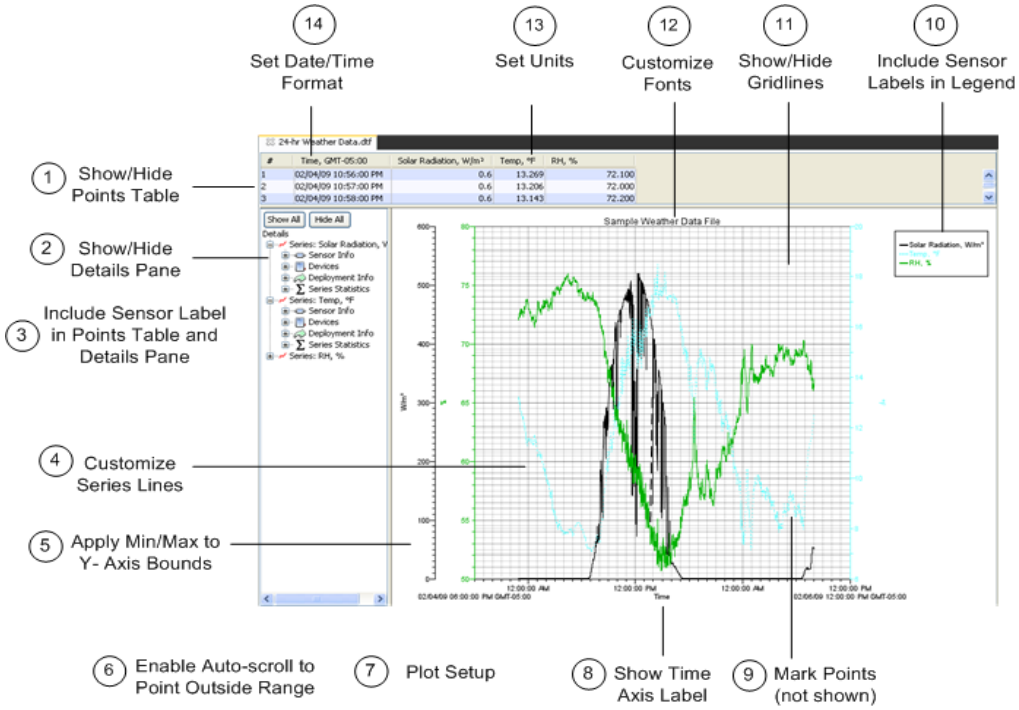
Double-click on a series to open the Series Properties window. See Setting Series Properties on page 63 for more information.

5. Axis Properties

Double-click on one of the axis to open the Axis Properties window. See Setting Axis Properties on page 62 for more information.

Setting Properties for all Plots

This topic outlines preferences that you can apply to all plots that you generate or open in HOBOware. To access plotting preferences, from the main menu select Preferences and then click the Plotting tab.


14 Set Date/Time Format
13 Set Units
12 Customize Fonts
11 Show/Hide Gridlines
10 Include Sensor Labels in Legend
1 Show/Hide Points Table
2 Show/Hide Details Pane
3 Include Sensor Label in Points Table and Details Pane
4 Customize Series Lines
5 Apply Min/Max to Y- Axis Bounds
6 Enable Auto-scroll to Point Outside Range
7 Plot Setup
8 Show Time Axis Label
9 Mark Points (not shown)
Sample Weather Data File

1. Show/Hide Points Table

In the Layout section of the Plotting Preferences you can control the display of the Points Table.

2. Show/Hide Details Pane

In the Layout section of the Plotting Preferences you can control the display of the Details Pane.

3. Include Sensor Label in Points Table and Details Pane

By default, labels added for station-type loggers are shown in the Points and Details panes. If you do not want to include the label, deselect *Use sensor Location* in the Points Table & Details Pane section of the Plotting Preferences.

4. Customize Series Lines

Use the lines preferences to define the appearance of lines in the plot for a specific series type.

5. Apply Min/Max to Y-Axis Bounds

Use the Value Axis Preferences to apply a minimum and maximum value for the Y-Axis to for plots for a specific series type.

6. Enable Auto Scrolling

Normally, if you are zoom in and click a point in the Points table that is outside the zoom area, the plot will scroll so that the marked point is in view, while retaining your zoom factor. Uncheck the *When selected value in table is out of plot range, drag series to that value* box if you do not want to scroll to points outside of the current view.

7. Plot Setup

The Plot Setup section of the Plotting Preferences gives you two options when generating a plot:

- Automatically select all data series for plotting
- Automatically select internal events for plotting

8. Label Time Axis

By default, the time axis is not labeled when you display a plot. If you enable this preference, the time axis will have a default name of "Time" when you open a plot.

9. Mark Points

By default, points on a series are not marked. To have all points marked by default, go to Preferences > Plotting > Other Options and select the *Mark all points when plotting data* option. **NOTE**: Opening a large plot with all points marked takes longer and consumes more system memory

10. Include Sensor Labels in Legend

If a label has been assigned to a sensor, include it in the legend.

11. Show/Hide Gridlines

By default, vertical gridlines are always shown for the time axes; horizontal gridlines are not shown. You can use the gridline icons and on the toolbar, or the Gridlines item on the View menu, to toggle all horizontal or all vertical gridlines on and off.

You may also toggle gridlines on and off for each axis individually. Using the arrow tool, double-click an axis to get the Axis Properties window. Check the Show Gridlines box to display gridlines for that axis, or clear the Show Gridlines box to hide the gridlines.

Go to Preferences > Plotting > Gridlines to control whether plots open with horizontal and/or vertical gridlines displayed.

12. Customize Fonts

By default, most text in a graph is 9 points. To re-size the font (from 8 to 14 points), go to Preferences > Plotting > Fonts.

13. Set Units

This setting allows you to set a default of US or SI (Metric) units throughout HOBOware .

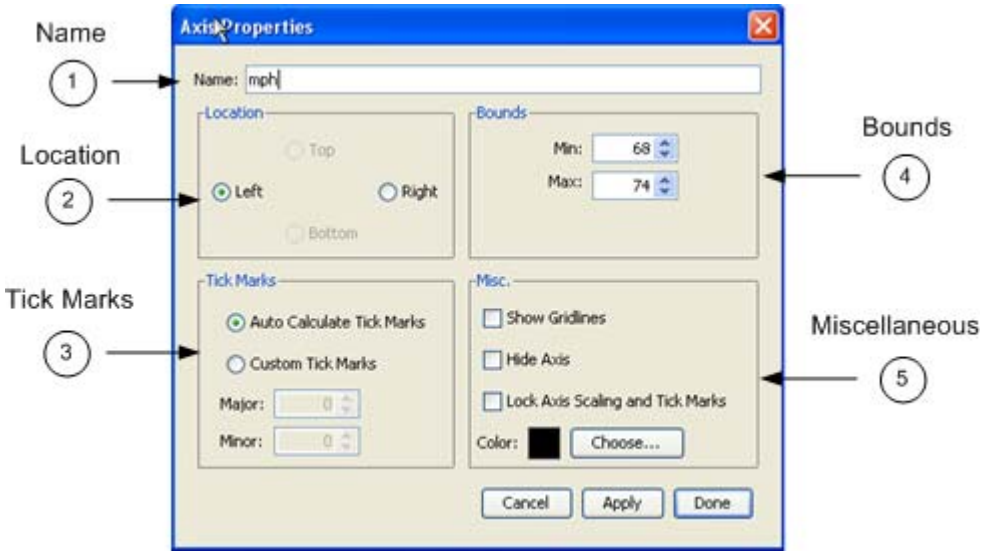
14. Set Time Format

Configure the date and time to your desired format.

Setting Axis Properties

To change the axis properties, double-click the axis you wish to modify with the arrow tool, or select the axis and click the Properties icon .

The Axis Properties window appears.



1. Name

Enter up to a 40-character name for the axis. The default name for a value axis is the unit type (for example, "°F" is the name for a temperature axis and "%" is the name for an RH axis).

Normally, the time axis is not named when you display a plot. If you want plots to open with the time axis labeled as "Time" by default, change the setting in Preferences > Plotting > **Other Options** .

2. Location

Change the location of the axis. The time axis can be located at the top or bottom. The value axes can be located on the left or right.

3. Tick Marks

Tick marks are the lines that represent values on the axis. Numbers or values are listed next to major tick marks; minor tick marks are not numbered

- *Auto Calculate Tick Marks*

  By default, tick marks are automatically calculated for both the time and value axes.

- *Custom Tick Marks*

  Choose this option to specify different major and minor tick marks for the axis.

4. Bounds

Min: Enter the minimum value you want displayed for the axis. For the time axis, you can select a date and time.

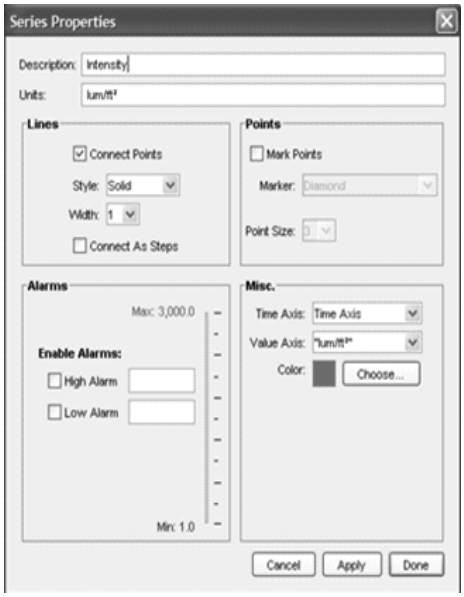
Max: Enter the maximum value you want displayed for the axis. For the time axis, you can select a date and time.

5. Miscellaneous

- Show Gridlines: Toggles whether gridlines are displayed in the background. By default, gridlines are shown for the time axis only.
- Hide Axis: Toggles whether the axis is displayed or temporarily hidden. Axes for sensor series are visible by default.
- Lock Axis Scaling and Tick Marks: Toggles whether the axis and associated tick marks remain in the original position when zooming or navigating with the hand tool. Locking the axis and tick marks helps to avoid inadvertently zooming or navigating to an area on the graph without data.
- Color**:** Changes the color of the axis. Black is the default color for the time axis. The color of the value axis matches the series color by default.

Setting Series Properties

A series is the group of data points for the sensor measurement, state, or event you selected to display in the plot. To change series properties, double-click the series you wish to modify or select the series and click the Properties icon on the main menu.



The following options are available in the Series Properties window:

1. Description: Enter up to a 40-character name for the series. The series name is displayed in the legend. The default name for a series with sensor data is the property that was measured and the units used to display the measurements. The default name for a series with event or state data is the type of event or state.
2. Units: Enter the unit type in this field, if it is different from the default. If, while viewing the plot, you convert to another type of unit, the text you enter here will change to the default name for the unit you chose.
3. Lines Section

Connect Points: Toggles whether the points in this series are connected. This option is selected by default for most series; it is not selected for internal logger events.

Style: Changes the appearance of the line used to connect the points in a series. The default varies depending on how many series measuring the same property are being viewed.

Width: Changes the size or weight of the line used to connect the points in a series. The default is 1 point.

Connect as Steps: Toggles whether the lines between the points in a series are connected as a curve or a step. When this option is selected, the line drawn between points keeps the value of the previous point until the next point in the series. This is useful for state or event graphs. This option is not selected by default for sensor series.

4. Alarms Section

Enable Alarms: Alarms are available for sensor measurement series only, not state or event series.

Enabling alarms will show lines on the graph for this series, to indicate a visual threshold over or under which data may be falling (for example, if you want to quickly see how many points fall below 32 degrees). Alarms are turned off by default.

For High Alarm, enter a value relative to the series where you want the maximum (red) alarm line to appear.

For Low Alarm, enter a value relative to the series where you want the minimum (blue) alarm line to appear.

5. Points Section

Mark Points**:** If you enable Mark Points a marker appears at each data point in this series. By default, this option is selected for any series with event data or only one point. To avoid cluttering the graph, it is not selected by default for other series.

Marker**:** Changes the shape of the marker used. The default marker varies depending on how many series are being viewed.

Point size: Changes the point size for the marker.

6. Miscellaneous Section

Time Axis: Allows you to create an additional time axis for this series. This is useful when you want to compare data from two different time periods.

Value Axis: Changes the axis being used for the series. Choose one of the axes already in view, or select **New Value Axis** from the dropdown list to create your own.

Color: Changes the color used for the series. The default color varies depending on how many series are displayed on the graph.

Adding a Graph Label

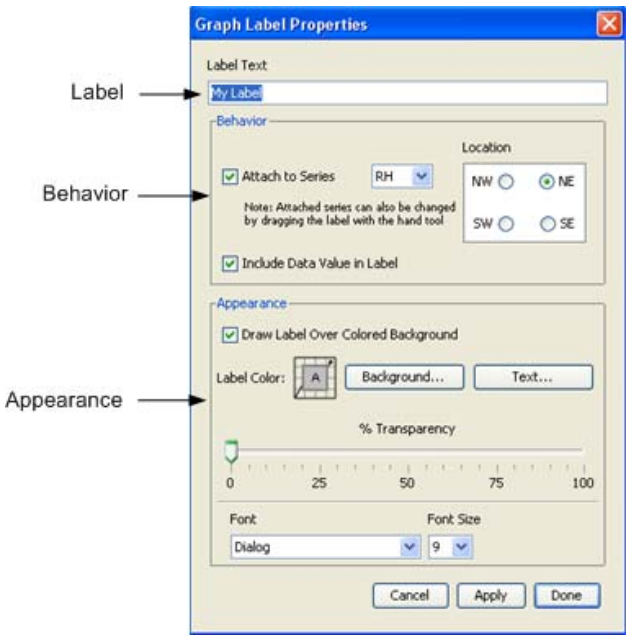
You can add multiple labels to a graph to identify specific points or call attention to a region of the graph.

1. Right-click the graph at the desired location and choose Add Graph Label from the pop-up menu

   (Alternative: Choose Add Graph Label from the Edit menu)

   NOTE: To change an existing label's properties, double-click the label or select the label and click the **Properties** icon on the main menu.

   The Graph Label Properties window appears.



2. Enter values in the Label Properties window as required. See Setting Label Properties for more information.
   - Label Text - Enter up to a 24-character name for the label.
   - Behavior

   Attach to Series: To attach the label to a point on a series, check this box and choose the name of the series from the drop-down list. (After you exit this window, you can use the hand tool to drag the label to the correct point.)

   Include Data Value in Label: If the label is attached to a series, check this box to have the label show the value of the labeled point.

   Location: If the label is attached to a series, choose a compass point to describe the preferred position of the label relative to the labeled point.

   Important: The *Location* indicates the preferred location of the label (space permitting) with respect to the data point it references. This is available only when the label is attached to a series.

   - Appearance

   Draw Label Over Colored Background: Check this box if you want the label to appear in a box with a colored background.

Label Color Background: If you chose to give the label a colored background, click this button to select a background color.

Label Color Text: Click this button to select a color for the label text.

% Transparency: Adjust the label's transparency. Transparency refers to the ability to see the graph through the label. At 0%, the label is opaque, and you cannot see the graph through it. At 100%, the label is invisible, and only the graph can be seen.

Font: Select a font for the label text.

Font Size: Select a font size for the label text.

3. Click the Apply button to apply the new label and keep the window open so you can add more labels.
4. Position Labels

   Use the Hand tool to drag labels to another location if required.

   If the label is attached to a series, you can drag the label to attach it to any other point on the graph. (The hand tool must be close enough to a point to attach the label.) Labels that are attached to a point will move with that point during zooming and panning. Free-floating labels do not move during zooming and panning.

4. When you have completed adding labels, click Done to close the window.

Deleting a Label

To delete a label from the graph, select the label you wish to remove and press the Delete key (Fn-Delete on a laptop computer), or right-click the label and choose Remove from the menu that appears.

Zooming, Panning, and Smart Scaling Plots

You can adjust the viewing area of the plot by zooming, panning, and smart scaling.

There are two ways to zoom: either by using the zoom tool or by selecting Zoom In or Zoom Out from the toolbar or the View menu. Use the zoom tool to zoom anywhere on the plot that you select, clicking the right-mouse button to zoom in or out. Use the Zoom In/Zoom Out icons to keep the plot centered as you zoom. To constrain the zoom to horizontal or vertical zooming, place the cursor over the axis you want to zoom and click the mouse button. Hold the mouse button down to continue to zoom. Click the right-mouse button to switch from zooming in to zooming out, and click it again to switch back.

Use the hand tool to pan the graph, which is dragging the plot viewing area along the x- or y-axis. Panning is especially helpful when you are zoomed into a detailed plot and want to focus on a different area without zooming out. To limit dragging to horizontal or vertical panning, place the cursor over the axis you want to drag, hold down the mouse button, and drag in the direction you want the plot to move.

When you first display a graph, the numerical bounds of the axes are on tick marks. After you have panned or zoomed, this may no longer be the case. Use smart scaling to correct that. With the hand, arrow, or crosshair tool, right-click anywhere on the graph and select **SmartScale Graph**. This will automatically adjust the axes to end on tick marks.

Tip: You can always return to the original plot view by clicking the View at Full Scale from the toolbar or the View menu.

Copying a Series to another Plot

To copy a series from one plot to another:

1. Open the source plot (the plot which includes the series you want to copy) and the destination plot (the plot where you want to paste the series).
2. In the source plot, choose the arrow tool and select the series you want to copy.
3. Copy the series:

   right-click on the series and choose **Copy Series** from the pop-up menu

   or, from the Main Menu select **Edit** > **Copy Series**

   or press **Ctrl+C** (Windows) or **Command-C** (Mac)

4. Go to the other plot and with the arrow tool, right-click anywhere on the destination plot and

   choose **Paste Series** from the pop-up menu

   or, from the main menu select Edit > Paste Series

   or, press **Ctrl+V** (Windows) or **Command-V** (Mac)

   The new series is added to the graph, the Details pane, and the Points pane.

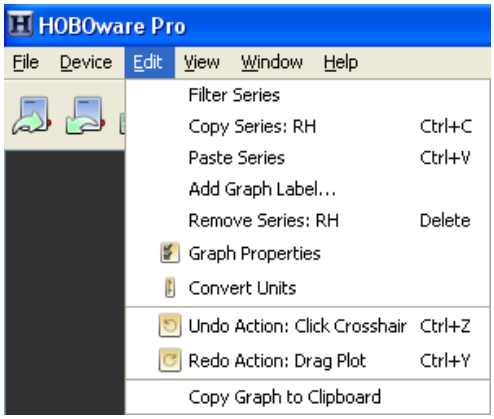
Undoing and Redoing Plot Changes

You can undo and redo changes made to the plot display, including zooming, panning, crosshair placement, graph and axis properties modifications, and more.

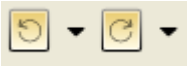
To undo the most recent change, click the Undo Action icon on the toolbar or select **Undo Action** from the **Edit** menu.

To redo the most recent change that had previously been undone, click the Redo Action icon on the toolbar or select **Redo Action** from the **Edit** menu.

When using the Edit menu for Undo or Redo, the most recent change is listed with the menu choice. In the following example, the most recent change that can be undone is to "Click Crosshair" and the most recent change that can be redone is to "Drag Plot."



HOBOware keeps track of the changes that you make within each plot window and temporarily stores them as "undoable actions." To see a complete list of all the actions that can be undone or redone, click the down arrow to the right of either icon on the toolbar.



The number of undoable actions stored is set within the plot preferences. You can configure HOBOware to either store a specific number of undoable actions or an unlimited number. In addition, you can enable or disable the feature altogether. Note that storing an unlimited number of actions can impact HOBOware performance on slower computers.

Saving Project Files

A project file (.hproj) is a plot that you have customized using the various features and tools of HOBOware. When you open a project file, the plot appears as it did when you saved the project file, and contains all of the same data.

To save your current data with a customized view of the plot, click the Save icon on the toolbar, or choose Save Project from the File menu. To open an existing project file, choose Open Project from the File menu.

Printing Plot Elements

Printing a Graph

You can simply print the graph, or you can set up the page and preview it before printing.

To set up the paper for printing the graph:

1. From the File menu, choose **Page Setup**.
2. Change the paper type, orientation, and margins as necessary and click **OK**.
3. To preview how the graph will look on the page: from the File menu, choose **Print Preview**.
4. Zoom as necessary
5. Click the Print icon to print directly from Print Preview. Or, click **Close** to exit the preview window without printing.

To print the graph:

1. Click the Print icon on the toolbar, or choose **Print** from the File menu.
2. Select the appropriate printer, if applicable, and click **OK**.

Printing Points and Details

You can print all of the data in the Points or Details panes. From the **File** menu, select ***Print Points*** (available only with Java 1.5 or higher) or *Print Details*.

If you highlight a selection of points with your mouse before choosing *Print Points*, you will also be given the option to print only the selected points.

Closing a Plot

Important: Property changes are not saved when you close the datafile. To preserve these changes, you can paste a bitmap of the graph into other programs, or save changes to the plot in a .hproj project file.

To close a plot, click the Close icon on the toolbar, or choose **Close** from the File menu.

To close a plot when you are in Tabbed View:

- Windows: click the **Close** icon on the tab of the plot.
- Mac: click the red button in the upper-left corner of the internal frame containing the plot.

If you made changes to the plot and then attempt to close it, a message appears asking if you wish to save your changes to a project file. Click Save to create an .hproj file.

To close all plots, choose **Close All** from the File menu.

NOTE: If you are sure that you do not want HOBOware to prompt you to save a plot as a project file when you close it: go to **Preferences** > **Warnings** > **General** and clear the checkmark next to "Prompt me if there is any remaining unsaved data when closing plot or application."

Chapter 4: Analyzing Data

Viewing a Plot

You can change your view of various aspects of the plot as you analyze the data.

Changing the Order of a Series

You can shuffle the order of series by moving a series to the front or back. This is helpful if one series is hidden behind another. It also changes the order of series in the Details pane, Points table, and the legend.

To change the order of the series:

1. Select the arrow tool from the toolbar.
2. Select the series you wish to move.
3. Right-click and select either Bring Series to Front or Send Series to Back.

NOTE: After you adjust the order of the series for optimal viewing, copy the graph as a bitmap to paste into other programs, such as Microsoft Word® or PowerPoint®.

Viewing Multiple Plots

Use the Window menu to organize several plots by Tabbed View , Tile Horizontally, or Tile Vertically . See The Window Menu 212 for more details.

Converting Units

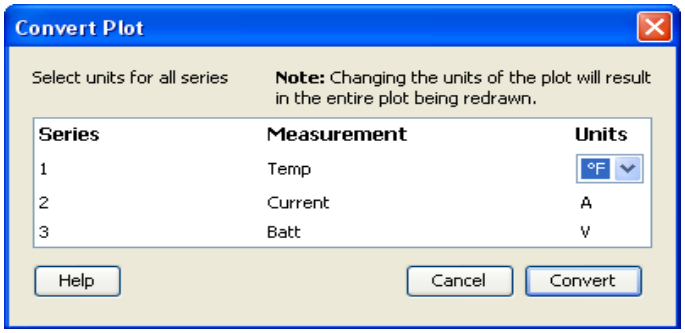
To change the units of an individual series, right-click the series with the arrow tool and choose **Convert Series Units**. Select the new unit type from the drop-down list.

To change the units for multiple series, use the **Convert Plot** window.

To access the **Convert Plot** window:

- click the Units icon on the toolbar
- or, from the Main Menu select **Edit** > **Convert Units**.

If a series can be configured with multiple units, there will be drop-down list in the units field. Select the desired units from the drop-down list, then click **Convert**. This changes the units displayed on the axis, in the legend, in the Details pane, and in the Points table.



Viewing Subset Statistics

NOTE: The Subset Statistics feature is only available with HOBOware Pro.

The Subset Statistics feature allows you to select a range of data in a graph, and display the maximum, minimum, average and standard deviation for the measurements in that range.

Demo: To view a Demo on Viewing Subset Statistics, visit http://www.onsetcomp.com/BHW_GraphingAnalysis.

Steps

1. Select the Subset Statistics tool from the toolbar:

Alternate Method: Press the **S** key on your keyboard when the mouse pointer is on the graph.

The mouse cursor will become the Subset Statistics Tool icon .

2. Draw Subset

With the left mouse button, click within the graph to define the start time of the subset and drag to the right. Release the mouse button when you reach the end time of the subset.

The graph subset appears in the graph, and the subset statistics pane appears in the left frame. See Overview of a Graph Subset for more information.

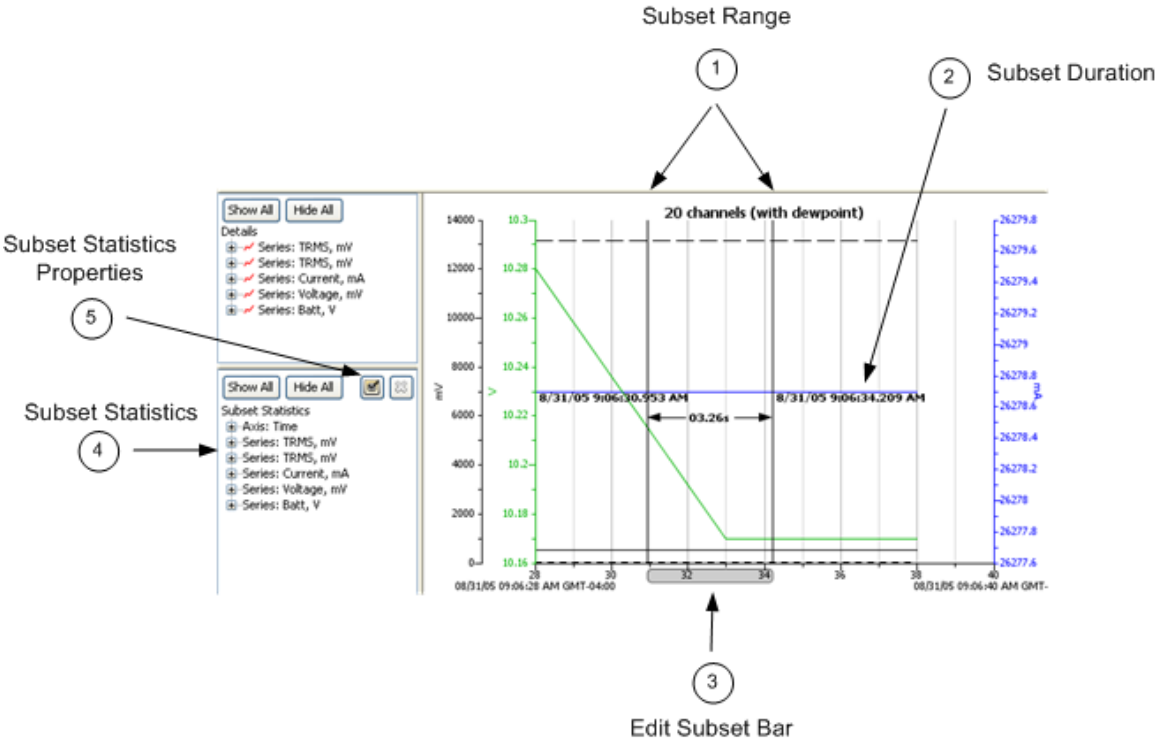
NOTE: When you first draw the subset, it is attached to the oldest time axis on the graph (the time axis that was created when you displayed the plot).

3. Refine Subset Range

To refine the range of the subset, click the checkmark icon in the Subset Statistics pane. This opens the Subset Statistics properties section of the **Axis Properties** window. See Setting Subset Statistics Properties for more information.

Overview of a Graph Subset

The Subset Statistics Tool allows you to select a subset of a graph, and display the maximum, minimum, average and standard deviation for the measurements in that range.



1. Subset Range:

Two vertical indicators (black) appear on the graph to show the range of the subset.

To adjust the start or end of the subset, click and drag the left or right end of the Edit Subset Bar. You can also use the arrow keys to move the left boundary, and *Ctrl+* (Windows) or *Command-* (Mac) arrow keys to move the right boundary. Place the cursor in the middle of the bar and drag to move the entire range left or right.

2. Subset Duration:

A labeled horizontal indicator (blue) shows the duration of the subset. Use the up and down arrows to move the horizontal indicator up or down.

3. Edit Subset Bar:

Resizing/Moving Subset: Place the cursor in the middle of the bar and drag to move the entire range left or right. Place the cursor at the edge of the bar to move the range. If you have multiple time axes, click inside the subset statistics bar to drag it to a different time axis.

Show/Hide Display: Double-click on the Edit Subset statistics bar to toggle between showing and hiding the display of subset indicators and labels.

4. Subset Statistics pane: Summarizes the data within the subset.
5. Subset Statistics Properties: Click on the check mark to access the Subset Statistics Properties window, which allows you to refine the subset to a precise time range.

Removing the Subset

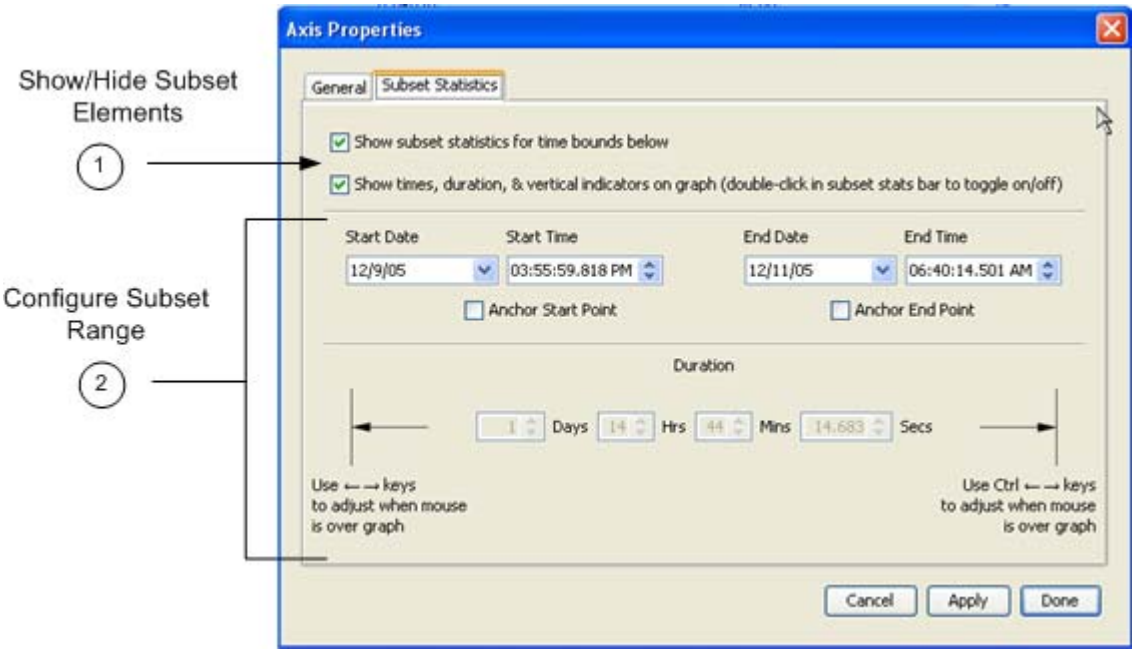
To remove the graph subset and related elements:

- Right-click on the graph and select **Remove Subset Stats** from the pop-up menu, or
- Choose **Remove Subset Stats** from the View menu, or
- Click the X icon in the upper-right corner of the Subset Statistics pane.

Setting Subset Statistics Properties

This topic describes the Subset Statistics section of the Axis Properties window, which you use to refine the range of a subset of a graph that you created using the Subset Statistics tool.

Subset Statistics Properties Window



1. Show/Hide Subset Elements

Show subset statistics for time bounds below

Check this box to enable subset statistics for this time axis. Only one time axis can have a subset. If you enable subset statistics for one time axis when another time axis already has a subset, the other time axis's subset will be removed.

Show times, duration, & vertical indicators on graph

Check this box to toggle the display of subset indicators and labels on the graph. If you disable this option, the Subset Statistics pane and the shaded subset statistics bar on the time axis will still remain visible.

2. Configure Subset Range

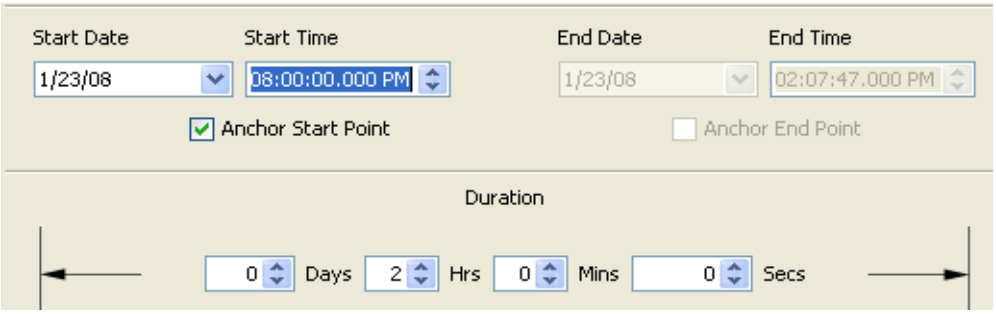
The easiest method to set a range for the subset is to indicate a fixed Start Date/Time or End Date/Time, and then indicate the duration.

Alternatively, you can enter both a Start Date/Time or End Date/Time without specifying a duration

Example 1

To set a range beginning at 8:00 a.m. on 1/23/08 with a duration of 2 hours:

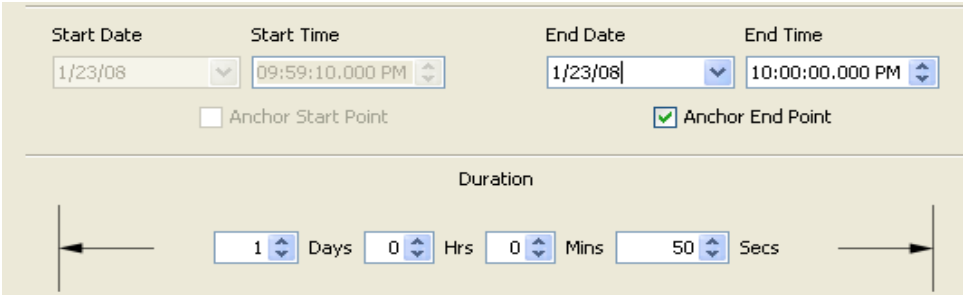
1. Check the **Show subset statistics** box.
2. Set the **Start Date** to 1/23/08
3. Set the **Start Time** to 08:00:00.000 AM
4. Check the **Anchor Start Point** box.
5. Set the **Duration** to 2 Hours.



Example 2

To configure a range of 1 day prior to 10:00 PM on January 23, 2008:

1. Set the **End Date** to 1/23/08
2. Set the **End Time** to 10:00:00.000 PM
3. Check the **Anchor End Point** box.
4. Set the **Duration** to 1 Day.



Filtering a Series

You can create a new series in a plot based on statistical analysis of an existing series over specified periods of time.

Steps

To filter a series:

1. Access the Filter Series window.

Option 1: Choose the arrow tool, select the series, right-click and choose **Filter Series** from the pop-up menu.

Option 2: Click on the series and then from the Main Menu select **Edit** > **Filter Series**

2. Choose the type of statistic to use for the filter:

For sensor series, you can create a series showing the minimum, maximum, or average over a period of time.

For external event series, you can create a series showing a cumulative sum, or a count over a period of time.

For internal event series, you can create a series showing a count over a period of time.

For series created by Data Assistants (HOBOware Pro Only), additional filters may be available.

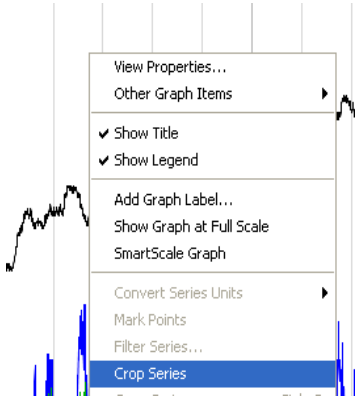
3. Specify the interval over which you want these values to be calculated.
4. Enter a new **Resultant Series Name**, if desired.
5. Click **OK**. The new series is added to the graph, the **Details** pane, and the **Points** pane. Note that when you apply a filter, the graph rescales to accommodate all of the displayed data.

Note: This filter only applies to existing data files/plots. There is an additional filter tool available when launching most loggers.

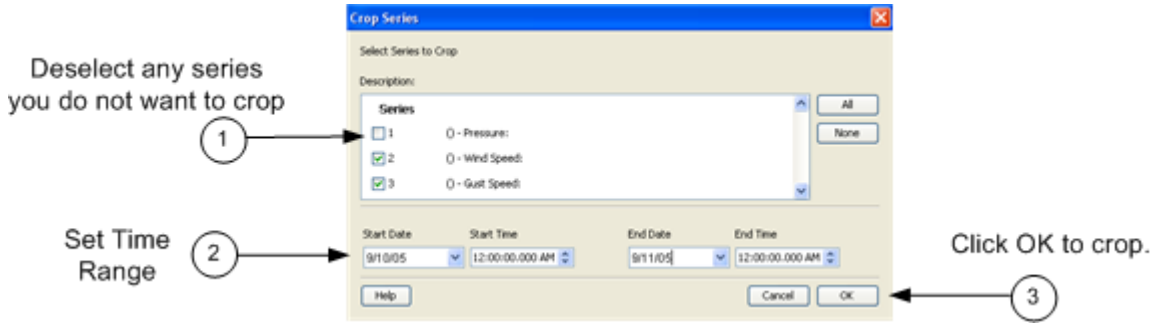
Cropping a Series

This feature allows you to remove data from a series by changing the time frame. You can crop one or multiple series in a plot.

1. To crop multiple series, right-click anywhere in the plot (without a series selected). To crop a single series, right-click on the series and select Crop Series.



The Series to Crop window appears.



2. Series to Crop

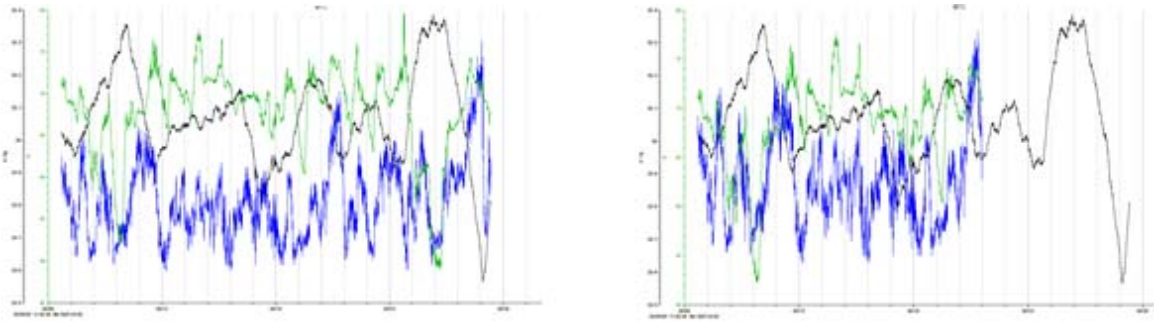
Deselect any series you do not want to crop.

3. Set Time Range

   Define the boundaries of the new series (inclusive, and limited to the minimum and maximum date and time of the Time Axis in the plot). If the stats tool has been used on the plot, the stats tool start and end points will be selected by default.

4. Click the OK button.

   The Selected Series will be cropped, as shown in the example below.



Original Plot Cropped Plot

The Cropped Series will be indicated in the Details Pane, and the Points Table will reflect the new time range.

Overlaying Series

If the series you are comparing were logged at different times, you will need to make some adjustments to the plot in order to view the series together.

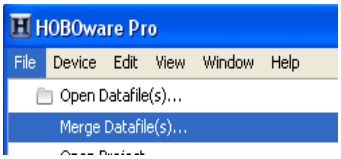
1. Display the source plot(s) and the destination plot.
2. On the destination plot, choose the arrow tool
3. Double-click the time axis to access the Axis Properties dialog.
4. In the Axis Properties dialog, give the axis a unique **Name**
5. Click **Done**.
6. Copy a series from a source plot.
7. Paste the series into the destination plot. When you paste the series, a new time axis will appear on the graph.
8. Double-click the new time axis to access the Axis Properties dialog.
9. Give the axis a unique **Name**
10. Click **Done**.
11. Repeat steps 6-10 for each series you want to paste.
12. Identify the periods of interest in each series you want to combine and note the times for each. Also, determine which period is the longest; this should be the length of time shown on each axis.
13. Double-click a time axis and adjust its **Min** and **Max** bounds. The new bounds should include the period of interest for the series, and be the same length as the longest period identified in step 4. Repeat for each time axis.
14. Use the hand tool on each time axis to adjust the series horizontally as needed.

Merging Datafiles

This feature allows you to combine multiple datafiles from a deployment into one file.

Steps

1. Open the first file (oldest).
2. Select Merge Datafile(s) from the File menu.

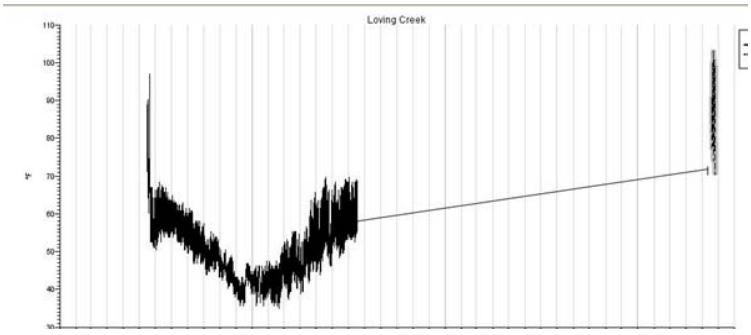


3. Select the datafiles you want to merge.
4. Click **Open**.

The Merge Series Setup window appears. See The Merge Series Setup window on page 206 for details.

Merged Series

The gap between the two series will appear as a line linking between the last sample in the series and the first sample in the next series.



After the series have been merged the Details Pane will be regenerated, Series Statistics will be recalculated, and a new node will be added in the Deployment Info indicating that the series has been merged with another series.

The samples table will be regenerated and will show samples of both series in one column. The different logger information is added to the tree, showing the specific information about the different loggers that collected the data samples.

Removing a Series from a Plot

You can remove sensor, state, and event data series from the plot. This is helpful if the datafile contains multiple series and you cannot easily view them all together.

Steps

To remove a series from a plot:

1. Select the arrow tool from the toolbar.
2. Click the series you wish to remove and press the **Delete** key, or right-click the series and choose **Remove** from the menu that appears. On a laptop computer press **Fn-Delete**.

A warning appears, indicating that the only way to add the series back to the plot is to reopen the plot.

3. Click **Yes**.

The series is removed from the graph, the Details pane, and the Points table.

Data Assistants

Overview

HOBOware Pro Data Assistants let you create new data series by combining data recorded by the logger with additional data that you enter before you display the plot. For example, the kWh Assistant converts logged pulse data from an energy transducer to kWh, average kW, and energy cost.

All Data Assistants can be run from the **Plot Setup** window after you read out a logger or open a datafile. With this method you need to run the Data Assistant each time you read out the logger or open a datafile. Some Data Assistants (Pulse Scaling, Linear Scaling, kWh) can also be run from the **Launch** window, so that parameters are applied automatically each time you read out the logger or open a data file.

Installing a Data Assistant

Data Assistants are included in the HOBOware application. However, there may be times when a new Data Assistant is released between HOBOware Pro releases. To install a new Data Assistant, click the Load button on the Plot Setup window and select the assistant's .jar file.

Software Updates

If you have an Internet connection, HOBOware Pro can periodically ask if you would like it to check the Onset website for software updates. This includes updates to your data assistants.

The default is to check once per week, but you can configure HOBOware Pro to check daily or monthly. In Preferences, go to the General pane. Check for HOBOware updates is located under the Startup heading.

You may check for updates manually at any time. Choose Check for Updates from the Help menu.

License Agreement

This software is furnished in accordance with a separate license agreement included with the software, and subject to any restrictions set forth therein. For more information about Onset's licensing terms and policies, contact Onset Customer Service at 1 800 LOGGERS, or visit http://www.onsetcomp.com/legal.

Using Data Assistants

There are two methods for using Data Assistants:

- Plot Setup (all Data Assistants)

  When you read out a logger, open a data file, or merge datafiles, all available assistants are listed in the Data Assistants section at the bottom of the Plot Setup window. To use a Data Assistant, click the assistant name to select it, and then click the **Process** button.

- Launch (Scaling Data Assistants: Linear Scaling, Pulse Scaling and kWh)

  For some data loggers, you can run the Linear Scaling, Pulse Scaling, and kWh Data Assistants from the Launch Logger window to create additional data series that are automatically available when you read out the logger and open the resultant data file. To use an assistant from the Launch Logger window, click the

Scaling or kWh button and then double click the desired assistant, or select the assistant and click the Create or Edit button.

Default Settings

The parameters last entered into any given Data Assistant will be the default used the next time the Data Assistant is run, unless it is being used to edit an existing parameter set. If you run a Data Assistant at Plot Setup time, and then later you run it from the **Launch** window, the default values are the value you entered at Plot Setup time.

Hiding Assistants

To prevent unwanted assistants from appearing in the Plot Setup window, or to bring back assistants that you have previously hidden, click the **Manage** button. This will open the Preferences window to allow you to change these settings.

Summary of Data Assistants

The following Data Assistants are available:

Barometric Compensation Assistant

Use the Barometric Compensation Assistant to compensate for barometric pressure and create a water level or sensor depth series. The BCA uses water pressure data from a HOBO U20 Water Level Logger and additional information you provide. After you use the assistant and display the plot, you may apply filters to the new series.

Growing Degree Days Assistant

Use the Growing Degree Days Assistant to calculate growing degree days based on temperature data spanning at least one full calendar day (midnight to midnight). Growing degree days are used for agricultural and turf management applications, such as estimating harvest time or pest growth.

Grains Per Pound Assistant

Use the Grains Per Pound Assistant to calculate the absolute amount of water in the air, based on temperature, humidity, dew point, and altitude. You can also create an altitude-corrected dew point series.

kWh Assistant

Use the kWh Assistant to convert logged pulse data from a WattNode, Veris, or other energy transducer to kWh, average kW, and energy cost. The kWh Assistant can be run during Plot Setup or at Launch.

Pulse Scaling Assistant

Use the Pulse Scaling Assistant to convert a data series from a compatible sensor to some other measurement. You enter a raw value and its corresponding measurement value. The Pulse Scaling Assistant can be run during Plot Setup or at Launch.

Linear Scaling Assistant

Use the Linear Scaling Assistant to convert a data series from a compatible sensor to some other measurement. You enter two raw values and their corresponding measurement values. The conversion must be based on a linear relationship. Nonlinear scaling is not available.

Conductivity Assistant

Use the Conductivity Assistant to apply compensation to absolute conductance data from a U24 logger.

Barometric Compensation Data Assistant

Introduction

The Barometric Compensation Assistant uses water pressure data from a HOBO U20 Water Level Logger and additional information from you to compensate for barometric pressure and create a water level or sensor depth series.

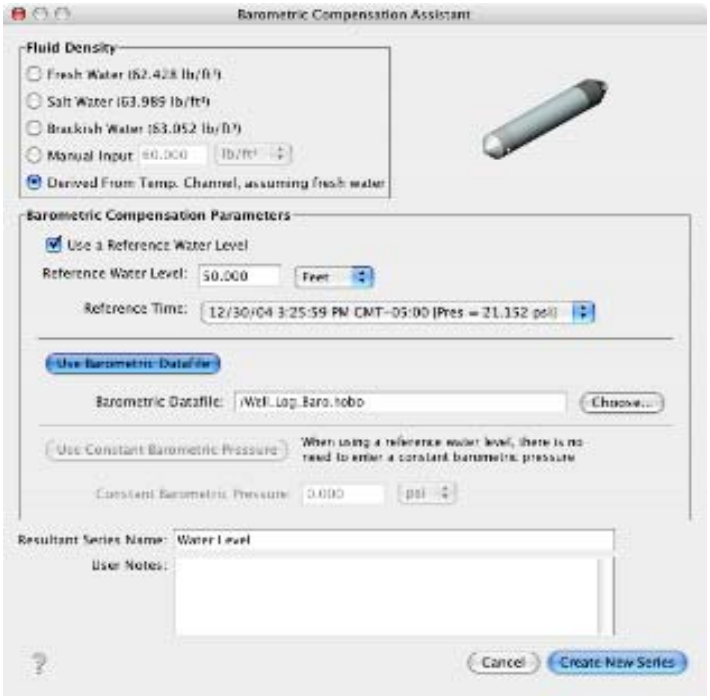
After you use the assistant and display the plot, you may apply filters to the new series.

Using the Barometric Compensation Assistant

To create a water level or sensor depth series:

1. Read out a logger or open a datafile that contains water pressure data from a U20 Water Level Logger.
2. From the Plot Setup dialog, select Barometric Compensation Assistant and click Process.

   The Barometric Compensation Assistant dialog appears.



3. Provide Fluid Density information by choosing a water type (fresh, salt, or brackish), entering a specific constant value, or using the temperature series (if logged) to use temperature-compensated density assuming fresh water.
4. To enter a reference water level, check the Use a Reference Water Level box, enter the water level, and indicate whether it is in feet or meters.

   Enter the water level as a positive number if it is measured upward from a reference point below the water's surface, such as the water's height above sea level.

   Enter the water level as a negative number if it is measured downward from a reference point above the water's surface, such as a well cap.

   Then, from the drop-down, select the logged time and value that is closest to the time when you measured the water level.

When selecting a logged value and time to link to the reference level, make sure the logger readings have stabilized. When a logger is first deployed in water, it takes some time for its temperature to reach equilibrium. You will get the best accuracy if you link your reference reading to a stabilized logger reading.

When using a reference water level, the resulting series data will contain water level values relative to this reference level. If you do not use a reference water level, the resulting series data will contain values for absolute sensor depth.

5. You can either use a barometric data file from another source, or enter a fixed barometric pressure. For the most accurate water level results, use a reference water level and a barometric data file. The barometric data can come from another HOBO U20 Water Level Logger in air; a HOBO Weather Station, HOBO Micro Station, HOBO U30, or HOBO Energy Logger; or a text file from another source.

   To use another file to provide barometric information, click the Use Barometric Datafile button and enter (or browse to) the name of a .hobo, .hsec, .dtf, .dsec, or .txt file that contains a barometric pressure series from an overlapping time period. You will have the option to display this series on the plot.

   Important: To use a .txt file, see Import Text Files Requirements on page 95.

   To use a constant pressure value, click the Use Constant Barometric Pressure button. Enter the constant value and indicate whether it is in psi or kPa. (You cannot use a constant pressure value in combination with a reference water level.)

6. Keep the default Resultant Series Name, or enter a new one. You may also enter User Notes concerning the series you are creating.

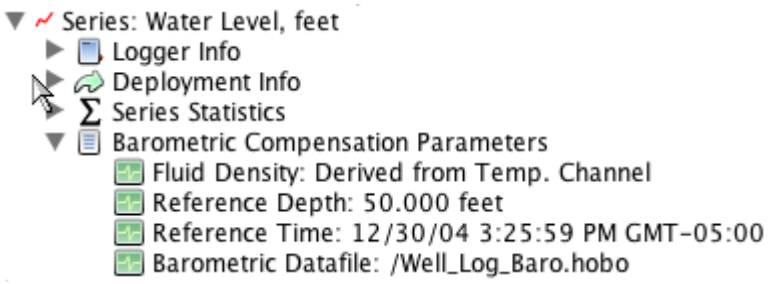
   NOTE: Your settings are retained, so you do not need to re-select your density and barometric file each time you use the Barometric Compensation Assistant as long as they still apply to the new water level data set.

7. Click Create New Series. The new series is listed and selected in the Plot Setup dialog.

   You can click Process on the Plot Setup dialog again to create another series using different barometric compensation parameters.

8. Click the **Plot** button.

   The settings you entered will be displayed in the Details pane of the plot.



Available Filters

After the plot is displayed, you may apply minimum, maximum, and average filters to the new water level or sensor depth series as you would for any sensor data series in HOBOware Pro.

kWh Assistant

The kWh Assistant converts logged pulse data to kWh, average kW, and energy cost with WattNode, Veris, or other energy transducers, and from Raw Pulse sensors attached to a HOBO 4-Channel Pulse Input Data Logger (UX120-017x).

This assistant can be applied to logged data from a S-UCA-xxxx or S-UCC-xxxx Electronic Switch Pulse Input Adapter. It is not compatible with the S-UCB-xxxx or S-UCD-xxxx Contact Closure Pulse Input Adapter.

After you use the assistant and display the plot, you may apply filters to the new series.

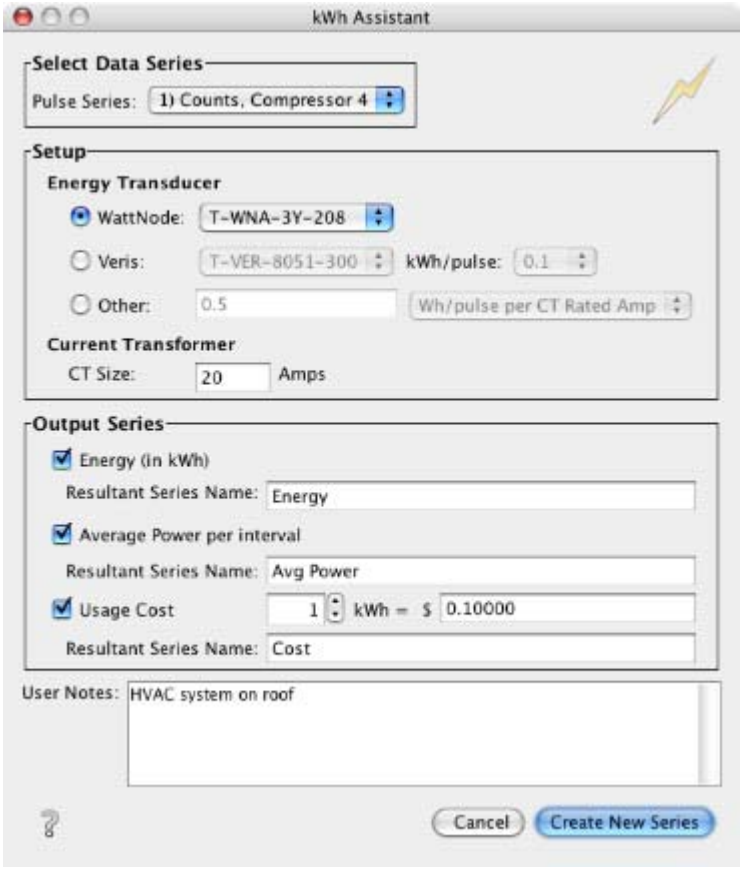
This data assistant is one of several launch utilities that can also be used at launch time for certain loggers.

Using the kWh Assistant

To create energy data from a pulse data series:

1. Read out a logger or open a datafile that contains a Counts series from a S-UCA-xxxx or S-UCC-xxxx Electronic Switch Pulse Input Adapter.

2. From the Plot Setup dialog, select kWh Assistant and click Process. The kWh Assistant dialog will appear.



3. If your datafile includes multiple Counts series, choose the one you want to convert from the Pulse Series drop-down list. (If your logger supports sensor locations, the location you entered will be displayed here.)

4. In the Setup panel, select the Energy Transducer that was used, and choose the model number from the drop-down list. (Since the Veris transducers have a switch to define kWh/pulse, you must specify that here as well.)

If your transducer is not listed, select Other and enter the conversion factor. Choose the type of conversion (Wh/pulse per CT Rated Amp, Wh/pulse, or kWh/pulse) from the drop-down list. You should be able to find this information in the manual that came with your energy transducer.

5. Enter the current transformer size (in Amps) in the CT Size field. (Veris transducer CT sizes are predefined.

6. In the Output Series panel, select one or more series you wish to create. For each series, you may keep the default Resultant Series Name, or enter a new one.

- To create a series that shows energy in kWh, check the Energy box.
- To create a series that shows average power, check the Average Power per interval box.
- To create a cost series, check the Usage Cost box and enter the cost per kWh.

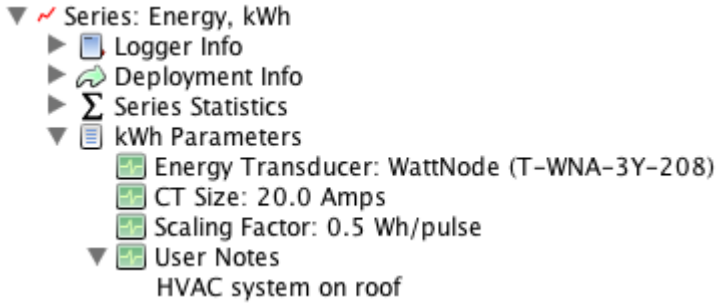
7. Enter any User Notes concerning the series you are creating (optional).

NOTE: All of these settings will be retained as default values the next time you access the kWh Assistant.

8. Click Create New Series. The new series are listed and selected in the Plot Setup dialog.

9. You can click Process on the Plot Setup dialog again to create additional series using a different raw series or different parameters.

10. Click the Plot button. The settings you entered will be displayed in the Details pane of the plot.



Available Filters

After the plot is displayed, you may apply filters to the new series as you would for any other series in HOBOware Pro. In addition to the minimum, maximum, and average filters that are available for most series, the energy and cost series allow you to create new series showing totals over a period of time.

Linear Scaling Assistant

The Linear Scaling Assistant converts a data series from a compatible sensor to some other measurement when you enter two raw values and their corresponding measurement values. The conversion must be based on a linear relationship. Nonlinear scaling is not supported. After you use the assistant and display the plot, you may apply filters to the new series.

Supported Sensors

This assistant is available for the following sensors:

- CABLE-2.5-STEREO Voltage Input Cable (for U12 loggers)
- CABLE-4-20-mA Input Cable (for U12 loggers)
- CABLE-ADAP5 (for U12 loggers)
- CABLE-ADAP10 (for U12 loggers)
- S-CIA-xxxx 12-bit 4-20mA Input Adapter
- S-VIA-xxxx 12-bit Voltage Input Adapter

- S-FS-CVIA FlexSmart™ Analog Module
- S-FS-TRMSA FlexSmart TRMS Module
- U30 Analog Sensor Port
- S-FS-TRMSA (U30 TRMSA Module)
- S-LWA-xxxx Leaf Wetness
- S-SMx-xxxx Soil Moisture

The Linear Scaling Assistant can be applied only to logged data from these sensors.

Other Types of Scaling

To avoid confusion, keep in mind the other types of scaling that are available within HOBOware Pro:

- FlexSmart™ modules are set up for scaling prior to launch, as part of the module configuration process. You can later rescale these scaled series using the Linear Scaling Assistant if you need to create a different measurement. See Configuring an Analog Module/Port.
- The Pulse Scaling Assistant is similar to the Linear Assistant, but only allows scaling of pulse data.

Running the Assistant

From the Launch window

1. Launch a logger that has a supported sensor connected.
2. In the Launch Logger window, click the **Scaling** button.
3. Double-click the assistant name (or select the assistant name and click the **Create** button).

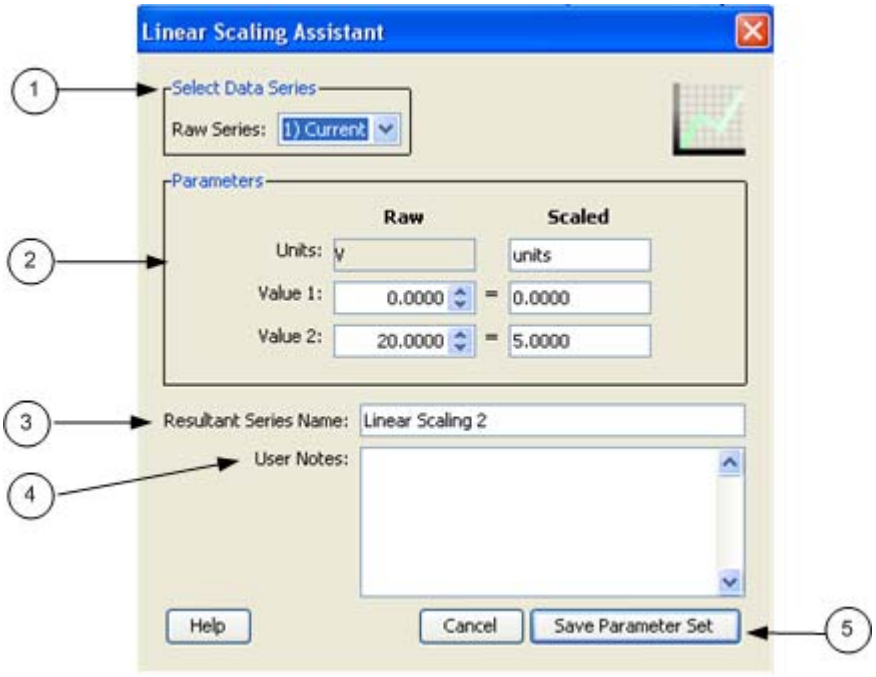
The Linear Scaling Assistant dialog will appear.

From the Plot Setup window

1. Read out a logger or open a datafile that contains a series from a supported sensor.
2. In the Plot Setup window, double-click the assistant name (or select the assistant name and click the **Process** button).

The Linear Scaling Assistant dialog will appear.

Using the Linear Scaling Assistant



1. Select Data Series - If your datafile includes multiple scalable series, choose the one you want to scale from the Raw Series drop-down list. (If your logger supports sensor locations, the location you entered will be displayed here.)
2. Parameters - In the Scaled column of the Parameters panel, enter the units name for the scaled series, and enter the scaled values in the Scaled column to correspond with the numbers in the Raw column. (The default values in the Raw column are based on the high and low values supported by the sensor, but you may use different values, as long as those values fall within the sensor's range.) These numbers establish a linear relationship between raw and scaled values.
3. Resultant Series Name - Keep the default name, or enter a new one. You may also enter User Notes concerning the series you are creating.
4. User Notes - (Optional) - Enter notes concerning the series you are creating.
5. Process Assistant

   If you ran the assistant from the Launch window, click the **Save Parameter Set** button.

   If you ran the assistant from the Plot Setup window, click the **Create New Series** nutton.

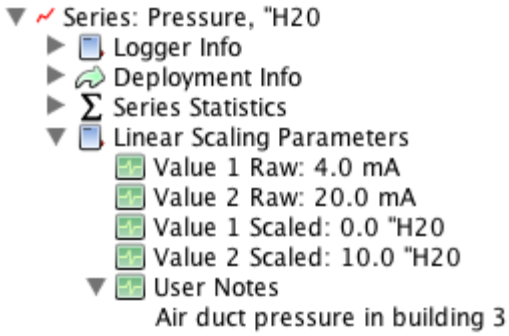
To create additional series using a different raw series or different parameters, click the **Create** button (if in the Launch window) or the **Process** button (if in the Plot Setup dialog).

If you are running the assistant from the Launch window, the parameters will be applied each time you readout the logger. If you are running the assistant from the Plot Setup window, the new series will be generated when you click the **Plot** button.

NOTE: All of these settings will be retained as default values the next time you access the assistant.

Scaled Series

The scaled series will appear in the graph, and data will be displayed in the legend and in the Details pane.



Available Filters

After the plot is displayed, you may apply minimum, maximum, and average filters to the scaled series as you would for any sensor data series in HOBOware Pro.

Pulse Scaling Assistant

The Pulse Scaling Assistant converts a data series from a compatible sensor to some other measurement when you enter a raw value and its corresponding measurement value. The conversion must be based on a linear relationship. Nonlinear scaling is not supported. After you use the assistant and display the plot, you may apply filters to the new series.

The Pulse Scaling Assistant can be run from the Launch window (Pre-set Parameters) or from the Plot Setup dialog. If you run the assistant from the Plot Setup dialog, you must run the assistant each time you readout the logger or open a datafile.

Supported Sensors

This assistant is available for the following sensors:

- S-UCA-xxxx and S-UCC-xxxx Electronic Switch Pulse Input Adapter
- S-UCB-xxxx and S-UCD-xxxx Contact Closure Pulse Input
- Raw Pulse sensors connected to the HOBO 4-Channel Pulse Input Data Logger (UX120-017x)

Other Types of Scaling

To avoid confusion, keep in mind the other types of scaling that are available within HOBOware Pro:

- FlexSmart™ modules are set up for scaling prior to launch, as part of the module configuration process. See Configuring an Analog Module/Port (page 109).
- The Linear Scaling Assistant is similar to the Pulse Scaling Assistant, but has slightly different input options and is compatible with a different group of sensors. See the Linear Scaling Assistant (page 83) for more information.

Pre-set Parameters

If you run the assistant from the Launch window, parameters are applied automatically each time you read out the logger. Once you have pre-defined a parameter set, the parameters are also used when current readings are viewed in the Status window. Parameter sets are stored on the logger and apply to that logger and channel configuration only.

The parameters last entered into any given Data Assistant will be the default used the next time the Data Assistant is run, unless it is being used to edit an existing parameter set. If you run a Data Assistant at Plot Setup time, and the next time you run it from the Launch window, the default values are the value you entered at Plot Setup time.

The Pre-set Parameters feature is available for the HOBO U30, the HOBO H21 (Weather Station and Micro Station), the HOBO H22 (Energy Logger), and the HOBO 4-Channel Pulse Input Data Loggers (UX120-017x).

Accessing the Pulse Scaling Assistant

From the Launch window

1. Launch a logger that has a supported sensor connected.
2. Click the **Scaling** button.
3. Double-click Pulse Scaling Assistant.
4. Click the **Create** button.

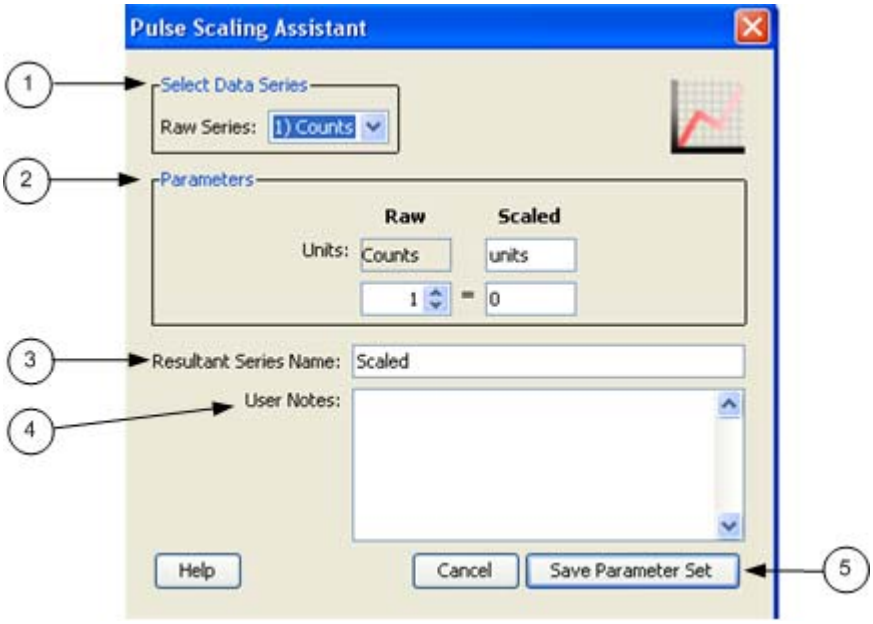
The Pulse Scaling Assistant window appears.

From the Plot Setup window

1. Read out a logger or open a data file that contains data from a compatible pulse sensor.
2. From the Plot Setup dialog , select Pulse Scaling Assistant.
3. Click the **Process** button.

The Pulse Scaling Assistant window appears.

The Pulse Scaling Assistant window



1. Select Data Series - If your data file includes multiple scalable series, choose the one you want to scale from the Raw Series drop-down list. (If your logger supports sensor locations, the location you entered will be displayed here.)
2. Parameters - In the Scaled column of the Parameters panel, enter the units name for the scaled series, and enter a scaled value in the Scaled box to correspond with the number in the Raw box. These numbers establish the relationship between the raw and scaled values.
3. Resultant Series Name - Keep the default name, or enter a new one.
4. User Notes (Optional) - Enter notes concerning the series you are creating.

NOTE: All of these settings will be retained as default values the next time you access the Pulse Scaling Assistant.

5. Process Assistant

   If you ran the assistant from the Launch window, click the **Save Parameter Set** button.

   If you ran the assistant from the Plot Setup window, click the **Create New Series** nutton.

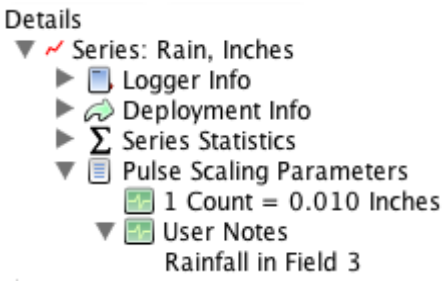
6. To create additional series using a different raw series or different parameters, click the **Create** button (if in the Launch window) or the **Process** button (if in the Plot Setup dialog).

If you are running the assistant from the Launch window, the parameters will be applied each time you readout the logger. If you are running the assistant from the Plot Setup window, the new series will be generated when you click the **Plot** button.

NOTE: All of these settings will be retained as default values the next time you access the assistant.

Scaled Series

The scaled series will appear in the graph, and data will be displayed in the legend and in the Details pane (shown below).



Available Filters

After the plot is displayed, you may apply filters to the scaled series as you would for any other series in HOBOware Pro. In addition to the minimum, maximum, and average filters that are available for most series, the scaled pulse series allows you to create a new series showing totals over a period of time.

Growing Degree Days Assistant

The Growing Degree Days Assistant calculates growing degree days based on temperature data spanning at least one full calendar day (midnight to midnight). Growing degree days are used for agricultural and turf management applications, such as estimating harvest time or pest growth.

One growing degree day (GDD) is equivalent to a one degree increase above a minimum threshold temperature for a period of one day. For example, assuming no horizontal cutoff, if the minimum threshold temperature is 70°F and the temperature was a constant 85°F for the day, the GDD for that day is 15 GDD.

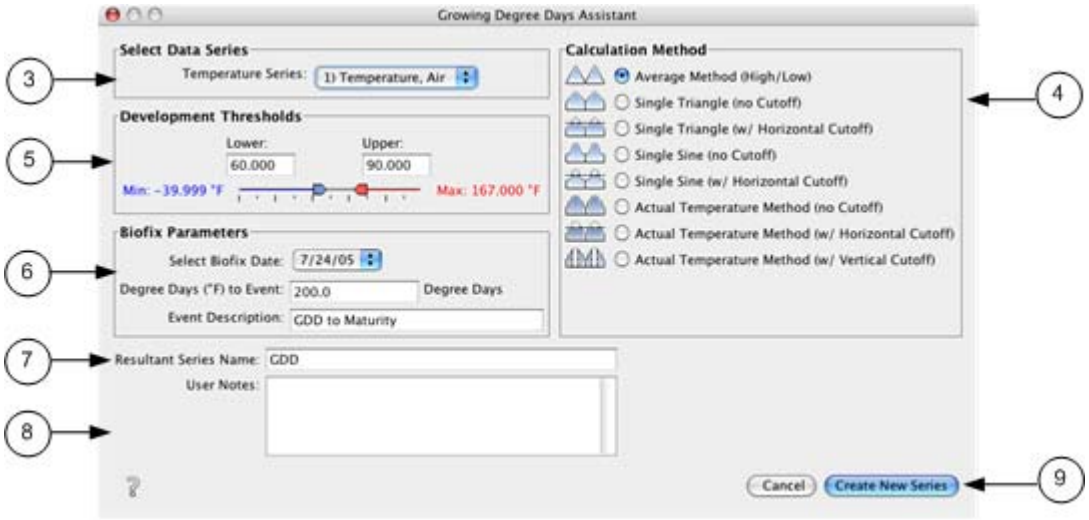
A single GDD value is calculated for each full calendar day of temperature data, and plotted at noon for that day. GDD values are cumulative; that is, the GDD for each day adds to the previous days' GDD value.

Important: Time of day is a factor in the GDD computation. When you launch a logger, be sure that your computer's clock is set to the proper time zone for the area where the logger will be deployed. If you try to correct it later by entering a different offset in the Plot Setup dialog, you may get confusing or misleading results.

Steps

1. Read out a logger or open a datafile that contains data from a temperature sensor.
2. From the Plot Setup window, select Growing Degree Days Assistant and click the **Process** button.

The Growing Degree Days Assistant window appears.



3. Select Data Series - If your datafile includes multiple temperature series, choose the series you want to use from the drop-down list. (If your logger supports sensor locations, the location you entered will be displayed here.)
4. Calculation Method - check the calculation method you want to use. See Calculation Methods below for more details.
5. Development Thresholds - Select lower and upper threshold values.

   These are the minimum and maximum thresholds that will be used in the GDD calculation. Use the sliders to set these thresholds, or enter the values manually. If the calculation method you chose does not use an upper threshold, the upper threshold option will be disabled.

   Temperatures are in degrees Fahrenheit if your default unit preference is US, and in degrees Celsius if your default unit preference is SI.

6. Biofix Parameters

   Select Biofix Date - choose a date that marks the beginning of the development phase. The dates in this list are the full days contained in the datafile.

   Degree Days to Event - enter the number of degree days needed to reach an event of interest (harvest time, pest emergence, etc.). This will create an alarm line on the graph to indicate when the event took place. Degree days are in Fahrenheit (DDf) if your default unit preference is US, and in Celsius (DDc) if your default unit preference is SI.

   Event Description (Optional) - enter text to identify the event.

7. Resultant Series Name - Keep the default or enter a new one.
8. User Notes (Optional) - enter notes describing the series you are creating.
9. Click the **Create New Series** button.

   The new series is listed and selected in the Plot Setup dialog.

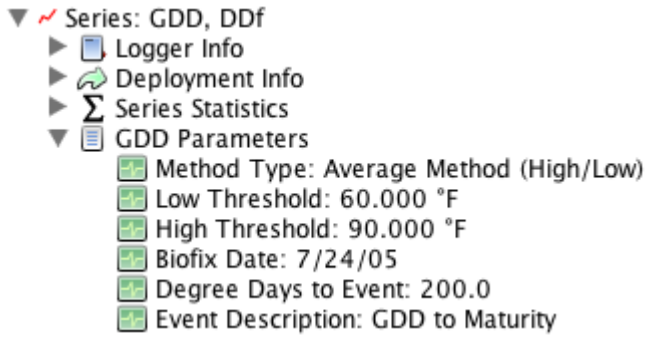
   To create another series using a different methods or parameters, click **Process** on the Plot Setup dialog again and enter new values.

10. Click the **Plot** button.

NOTE: All of these settings will be retained as default values the next time you access the assistant.

Scaled Series

The scaled series will appear in the graph, and data will be displayed in the legend and in the Details pane (shown below).



Calculation Method

Average Method

Calculates the average of the high and low temperatures for the day (adjusted to the lower and upper thresholds, if necessary), then subtracts the low threshold to compute the GDD.

Single Triangle (no cutoff)

Uses the low and high daily temperatures to compute a set of two linear equations to generate a triangle. The area between the curve and the low threshold is then used to compute the GDD.

Single Triangle (horizontal cutoff)

Uses the low and high daily temperatures to compute a set of two linear equations to generate a triangle. Then it adjusts any temperatures above the upper threshold to the upper threshold. The remaining area between the curve and the low threshold is then used to compute the GDD.

Single Sine (no cutoff)

Uses the low and high daily temperatures to compute a sine wave that assumes the low temperature occurred at midnight and the high temperature occurred at noon. The area between the curve and the low threshold is then used to compute the GDD.

Single Sine (horizontal cutoff)

Uses the low and high daily temperatures to compute a sine wave that assumes the low temperature occurred at midnight and the high temperature occurred at noon. Then it adjusts any temperatures above the upper threshold to the upper threshold. The remaining area between the curve and the low threshold is then used to compute the GDD.

Actual Temperature (no cutoff)

Uses the logging interval of the temperature data to perform a numerical integration. The area between the curve and the low threshold is used to compute the GDD.

Actual Temperature (horizontal cutoff)

Adjusts any temperatures above the upper threshold to the upper threshold. Then it uses the logging interval of the temperature data to perform a numerical integration. The area between the curve and the low threshold is then used to compute the GDD.

Actual Temperature (vertical cutoff)

Uses the logging interval of the temperature data to perform a numerical integration. Any interval in which the temperature exceeds the upper threshold is excluded from the calculation. The remaining area between the actual curve and the low threshold is then used to compute the GDD.

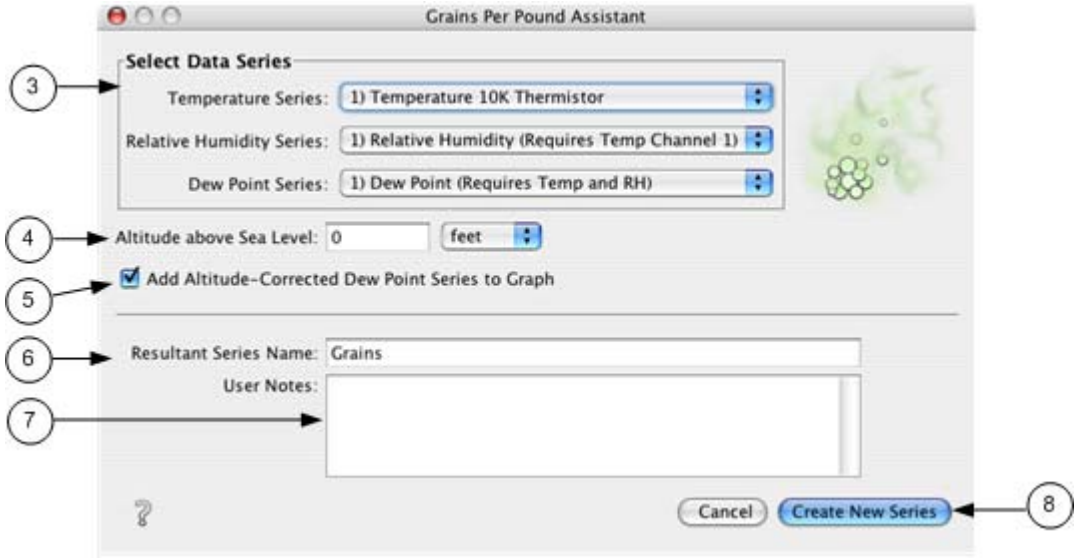
Grains Per Pound Assistant

The Grains Per Pound Assistant calculates the absolute amount of water in the air, based on temperature, humidity, dew point, and altitude. You can also create an altitude-corrected dew point series.

To create a grains per pound and altitude-corrected dew point series:

1. Read out a logger or open a datafile that contains temperature, humidity, and dew point series.
2. From the Plot Setup window, select Grains Per Pound Assistant and click the **Process** button.

   The Grains Per Pound Assistant window appears.



3. Select Data Series - If your datafile includes multiple temperature, humidity, or dew point series, choose the series you want to use from the drop-down lists. (If your logger supports sensor locations, the location you entered will be displayed here.)
4. Altitude above Sea Level - To correct for altitude (optional), enter the altitude use the drop-down menu to indicate whether this number is in feet or meters.
5. Add Altitude-Corrected Dew Point Series to Graph - Check this box to see an altitude-corrected dew point series on the graph.
6. Resultant Series Name - Keep the default or enter a new one.
7. User Notes (Optional) - Enter notes describing the series you are creating.
8. Click the Create New Series button to process the assistant.

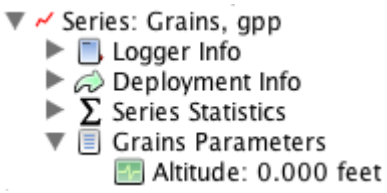
   The new grains per pound series (and altitude-corrected dew point series, if applicable) is listed and selected in the Plot Setup dialog.

   To create another series using different data series or altitudes, click the Process button on the Plot Setup window.

9. Click the **Plot** button.

Scaled Series

The scaled series will appear in the graph, and data will be displayed in the legend and in the Details pane.



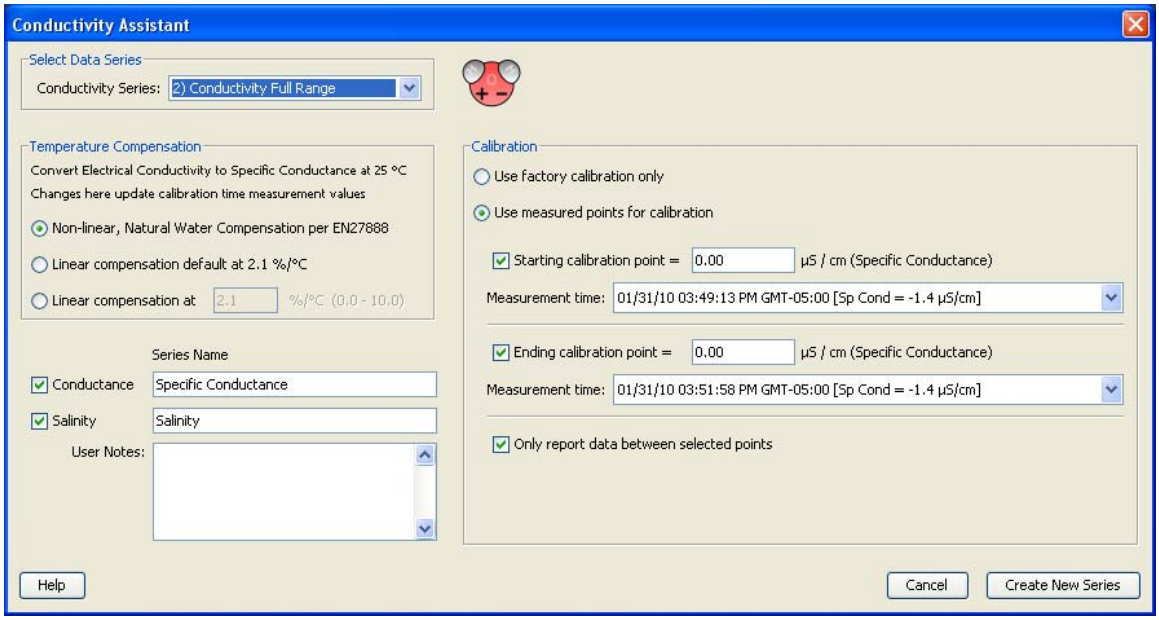
Available Filters

After the plot is displayed, you may apply minimum, maximum, and average filters to the grains per pound and altitude-corrected dew point series as you would for any sensor data series in HOBOware Pro.

Conductivity Assistant

Introduction

Use the Conductivity Assistant to apply compensation to absolute conductance data from a U24 Conductivity logger.



1. Select Data Series

   Select the series that corresponds to the range of your data. Note: If you only selected one range at launch time, only one series will appear here.

   - Conductivity Full Range (default) - when the data goes above 1000 µS/cm.

   - Conductivity Low Range - when the data is less than 1000 µS/cm.

2. Temperature Compensation

   Select your desired compensation method.

3. Calibration Method

   By default, data is calibrated using the factory values. To enter your own calibration values, select Use measured points for calibration and then enter data points derived from your specific conductance readings taken with a calibrated meter. See Calibration for more information.

   Starting and Ending Value: This method adjusts for any inaccuracy due to sensor drift or fouling. This assumes there is a linear change in calibration adjustment required.

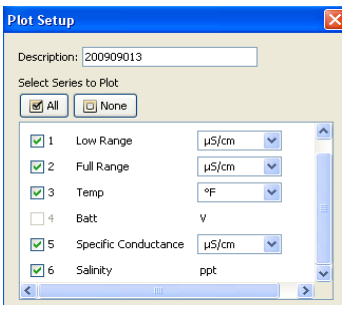
   Starting value only - All readings are adjusted up or down by a fixed value from this calibration point.

   Ending Value Only - The factory calibration value is used as the starting point. This assumes there is a linear change in calibration adjustment required.

4. *Only report data between the selected points*- Any readings from before or after the calibration points will be removed from the resulting series.
5. Series Name - The default is Specific Conductance. Enter new name if desired.
6. User Notes (Optional) - Enter notes if desired.
7. Click the Create New Series button to return to the Plot Setup dialog.

   The Plot Setup dialog will now contain a series called Specific Conductance (or the name you entered for Resultant Series Name).

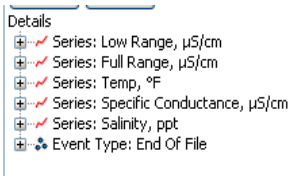
   The default units are microSiemens/cm (µS/cm). You can change the units to milliSiemens/cm (mS/cm) if desired. The default units for salinity are ppt (parts per thousand) and this cannot be changed.



   Click **Plot** to plot the data.

   The plot will appear.

   The Details Pane will show the three series: Abs Conductivity, Temp, and Specific Conductivity.



Available Filters

After the plot is displayed, you may apply minimum, maximum, and average filters to the scaled series as you would for any sensor data series in HOBOware Pro.

Importing Text Files

NOTE: This feature is only available in HOBOware Pro.

You may graph non-HOBOware data by importing data from certain text files:

- You can easily open text files that were created by Onset's Alarm & Readout Tool version 2.0 or higher.
- You can also open text files that were exported from Onset's BoxCar Pro 4.3 software, using the default BoxCar export settings. This allows you to view data from Onset loggers that cannot be readout using HOBOware Pro.
- With some adjustments, you can open text files that were exported from other software. You can also build text files from scratch, using historical or other types of information.

Steps

To import data from a properly formatted text file:

1. From the **File** menu, choose *Import Text Data*.
2. Select a text file (.txt) and click **Open**.
3. If the text file was created by the Alarm & Readout Tool, skip ahead to step 8.

   Otherwise, HOBOware Pro attempts to parse the text file and displays the Text Import Information window. To conserve system resources, it displays only the first several records in the file, not the entire contents.
4. Look at the data in the **Delimiter Preview** area to be sure that the date, time, and data columns were separated correctly.
   - If they were not, use the **Data Separator**, **Date/Time Separator**, and **Decimal Separator** pull down menus to choose other delimiters until the data looks correct.
   - You can resize the columns by clicking and dragging the dividers between the column headers.
   - For text files that were not exported in BoxCar's default format, click the **Edit Date/Time Format** button and ensure that the import function is interpreting incoming date, time, and year formats and separators correctly. Use the current date and time displayed in the Sample panel as a guide. Make changes as needed, then click **OK**.
5. When the **Delimiter Preview** is correct, click **OK**.
6. Depending on the file's contents, the Plot Setup window may be displayed at this time. If so, skip ahead to step 8.

   Otherwise, the **Text File Information** window is displayed. This window allows you to add optional information and change units, if needed.
   - Enter a **Description**, which will become the plot title and be included in the Details pane.
   - Select a **Model** from the list. If you select **Other/3rd Party**, you can enter a description (up to 20 characters) of the logger or other data source in the next field.
   - Enter the logger's **Serial Number**, if applicable.
   - In the **Channel Parameters** box, verify that the units are correct for the data in the file.
7. Click **OK**.
8. The Plot Setup window is displayed. Select the series you wish to view in the plot. You also have the option of changing the times on the plot to a different time zone.
9. When you have made your selections, click the **Plot** button.

The plot is displayed. You may want to save your work in a project (.hproj) file for quick viewing later.

Import Text Files Requirements

NOTE: This feature is only available in HOBOware Pro.

When you import a text file, the file must meet certain requirements. You can view or edit text files in a text editor or word processor. To delete, rearrange, or reformat columns of data, you may need to use a spreadsheet program. Remember to save the corrected file in text (.txt) format.

Serial Number

There may be an optional header for serial number information located at the beginning of the file, before the column headings. At the beginning of the line must be the phrase "Serial Number:" followed by a space, then the serial number, then two dashes:

Serial Number: 733329 --

Contents

Below the header (if any) should be the data, starting with column headings. There must be no other text in the file other than the optional header, column headings, and data. The first column must be date, the next must be time, and the rest must be data.

Delimiters

Valid delimiters for separating date and time are space, comma, tab, and semicolon. Valid delimiters for separating other data are comma, tab, and semicolon. The delimiter used to separate the date from the time may be different from the delimiter used to separate the data.

Date

The date column must have the heading, "Date" and date values should be formatted as mm/dd/yy. If they are in a different format, remember to indicate the correct format in the Edit Date/Time Format window when you import the file.

Date
12/31/04
12/31/04
01/01/05
01/01/05

Time

The time column must have the heading, "Time" and time values should be formatted in 24-hour format as hh:mm:ss.sss (decimals are optional). If they are in a different format, remember to indicate the correct format in the Edit Date/Time Format window when you import the file. UTC offset is assumed to be the same as your computer's current time zone.

Time
23:59:59
23:59:59.5
00:00:00
00:00:00.5

- No thousands separator can be used.
- Rows of data must be separated with a paragraph return.

Measurements

Data column headings must have the format "Measurement (Units)". Additional information (such as channel number or serial number) can follow, but is optional. Only spaces can be used between the end of the measurement name and the opening parenthesis. An example is "RH (%)".

RH (%)
38.7
38.9
39.0
39.0

If the column header and units of an imported series exactly matches the text in the table below, HOBOware will recognize the measurement and be able to perform unit conversions, apply data assistants, etc. to that series.

Measurements listed below that either have only one unit type, or can be any unit type, cannot have their units converted, but may still be used with applicable data assistants.

Measurements that are not listed in the table (or do not exactly match the text below) can be exported, but without any units conversions or use of Data Assistants.

Measurement Type	**Column Header**	**Units**
Acceleration	x accel, y accel, z accel	g, m/s2, ft/s2
Carbon Dioxide	co2	ppm
Counts	counts	*[any units]*
Dew Point	dew point	F, C
Leaf Wetness	leaf wetness	[any units]
Light Intensity	intensity	lux, lum/ft2
PAR	par	*[any units]*
Pressure	pres	kPa, Pa, mbar, mm Hg, psi, in Hg
Rain	rain	mm, in
Relative Humidity	rh	%
Soil Moisture	soil moisture	*[any units]*
Solar Radiation	solar rad	W/m2
Sum Vector	sum vector	g, m/s2, ft/s2
Temperature	temp	F, C
Tilt	x tilt, y tilt, z tilt	deg, rad
Wind Speed	wind speed	m/s, km/hr, mph, knots
Gust Speed	gust speed	m/s, km/hr, mph, knots
Wind Direction	wind direction	*[any units]*

Importing Files from HOBOlink

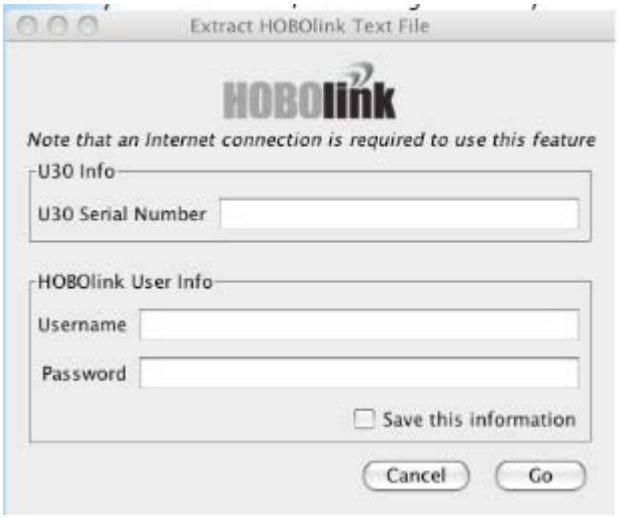
NOTE: This feature is only available in HOBOware Pro.

This feature allows you to import the current data file for a remote HOBO U30 Station from HOBOlink directly into HOBOware for analysis.

To import a file from HOBOlink into HOBOware:

1. Select **File** > **Import Data File from HOBOlink**

   The Import File from HOBOlink window appears.



2. Enter the serial number of the HOBO U30 Serial Number
3. Enter the Username and Password of the HOBOlink account.
4. To have your log in information saved, select the **Save this information** box.
5. To import the file, click **Go**.

Exporting Data

While HOBOware offers many tools for analyzing data, there may be instances where you need to export data for use in other software. Refer to the following for exporting data:

- Exporting data points
- Exporting details
- Bulk exporting

Exporting Table Data

Overview

You can export the points shown in the Points table to a text file (.csv or .txt) for importing into Microsoft Excel and other applications.

Before You Begin

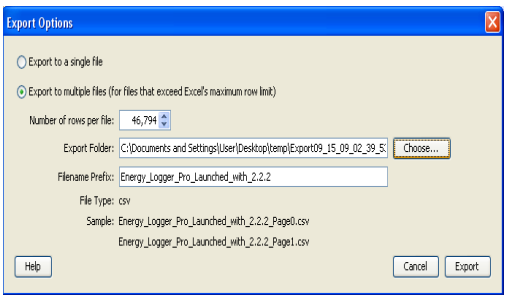
To change preferences for exporting, Preferences > General > Export Settings.

Steps

To export points:

1. Make sure the Points table includes the series you want to export. This might include series pasted from other datafiles, or series derived through filters or Data Assistants.
2. Click the Export icon on the toolbar, or choose **Export Table Data** from the File menu.

   The Export Options window appears.



3. Select Option
4. To export all of the data in a single file, choose **Export to a single file** and click **Export**. In the Save window, accept the default location and file name, or enter a new location and name and click **Save**.
5. To split the data over multiple files (particularly important if your data cannot fit in a single spreadsheet), choose **Export to multiple files** and make your selections:

   - Indicate the maximum **Number of rows per file**. Consult the documentation that came with your spreadsheet program to find out the maximum number of rows it accepts, and remember to leave room for header rows.
   - Accept the default **Export Location**, or click **Choose** to use a different location. (The default location creates a new folder for the files.)
   - Accept the default **Filename Prefix** (based on the datafile name), or enter a new one. The export file names will consist of this text plus "_PageX," where X indicates the order of the files (starting with 0).
   - Click **Export**.

You can now open the file(s) in Excel or another package. You can easily view the raw data in a text editor.

Exporting Data in BoxCar Format

The Export Settings pane gives you flexibility in setting various date and time formats, allowing you to export and import data in a format compatible with Onset's Box Car Pro software.

Select the **Use default Boxcar Pro export settings** option to have all Export settings set to Box Car defaults. See Export Settings for more information.

You can also change the following Display Preferences:

- 12 hour and 24 hour time formats
- MDY, DMY formats
- Date separator

Copying Points Data into another Application

To copy a series from one graph into another:

1. Select the data in the Points Table.
2. Copy Data

   Windows: press **Ctrl C**

   Mac: press **Command- C**

3. Open any text editor, word processor, or spreadsheet software.
4. Paste the data into the other application.

   Windows: press **Ctrl V**

   Mac: press **Command-V**

Fields are delimited by tabs, and records are separated by paragraph returns.

You can also copy the graph as a bitmap for pasting into other programs and documents. The graph must be visible when you do this.

With the graph visible, select *Copy Graph to Clipboard* from the Edit menu.

Formatting the Date/Time Column in Excel

In Excel, dates and times for each data point may initially appear as #######. Times also may not have seconds listed.

Steps

To display the full date and time with seconds in Excel:

1. Adjust the time column width so you can see the whole date and time.
2. Select the time column from row 3 down.
3. From the Format menu, click **Cells**.
4. Select the **Custom** category and then select **m/d/yyyy h:mm** as the type.
5. Add ":ss" (or ":ss.000" if you used a fast logging interval) to the end of the string in the **Type** field:

   m/d/yyyy h:mm:ss (normal logging interval)
   m/d/yyyy h:mm:ss.000 (fast logging interval)

6. Click **OK**.

The seconds should be listed automatically.

To export the date and time in separate columns go to Preferences> General > Export Settings and enable the *Date and time format: Separate into two columns*.

Exporting Details

Overview

You can export the information in the Details pane to a text file, which can be opened in any text editor, or imported into many other types of programs (word processors, spreadsheets, etc.).

To configure HOBOware to automatically export the data to a text file every time the logger is read out. See Export Settings on page 220.

Steps

To export details:

1. Make sure the Details pane includes the series you want to export. This might include series pasted from other datafiles, or series derived through filters or Data Assistants.
2. From the File menu, select **Export Details**.
3. Accept the default file name, or type a new name.
4. Click **Save**.

The Bulk Export Tool

The Bulk Export Tool is a plug-in tool for HOBOware Pro allows you to export HOBOware files to text format for use in programs other than HOBOware Pro.

You can export the following file types:

• .hobo

• .dtf

• .hsec

• .dsec

The Tool will take care of naming conflicts to prevent overwriting any pre-existing files, and writes a log file into the target folder that lists the files exported and the file names that were created for the created text files.

System Requirements

HOBOware Pro version 3.0.0 or higher

File Naming

For exported files the native extension is removed and ".txt" is appended.

Example: foo.hobo is renamed foo.txt

If a file name already exists, new files will be appended with "_0", "_1" etc.

Example:

foo.txt

foo_0.txt

foo_1.txt

Configuring Export Settings

The Bulk Export Tool uses the general export settings for HOBOware Pro.

To configure the Export Settings, go to: File > Preferences > General > Export Settings

YAML

You can choose to have YAML ("YAML Ain't a Markup Language") headers added to the exported files (they are not inserted by default). If enabled, YAML headers are inserted at the front end of the file. You can remove the YAML header using any text editor.

YAML™ (rhymes with "camel") is a human-friendly, cross language; Unicode based data serialization language designed around the common native data structures of agile programming languages.

For more information see yaml.org.

To enable YAML headers go to: File > Preferences > Bulk Export > YAML and check the Export with YAML Headers box.

Using the Bulk Export Tool

Exporting Files

1. From the Main Menu in HOBOware Pro, go to Tools > Bulk File Export > Select Files to Export ...
2. In the Select Files to Export dialog, select the files you wish to export and click Continue.
3. In the Choose Exports Folder dialog, navigate to the directory where you want the files to be exported and click Export.

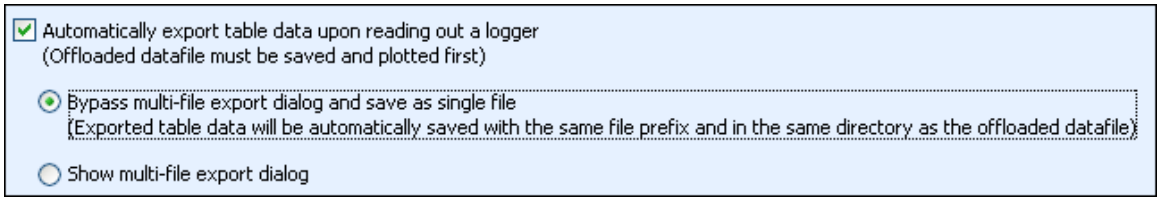
   A progress bar will indicate the status of the export (if this happens very quickly you may not see the bar).

   When the export completes, a dialog appears saying "Text file export complete".

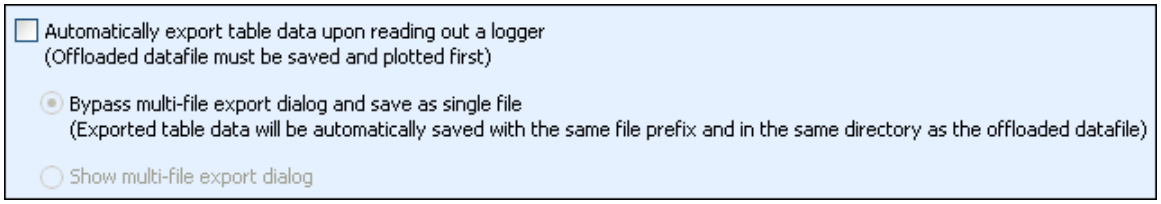
4. Click OK.

The .txt files and a log file will be located in the directory you specified.

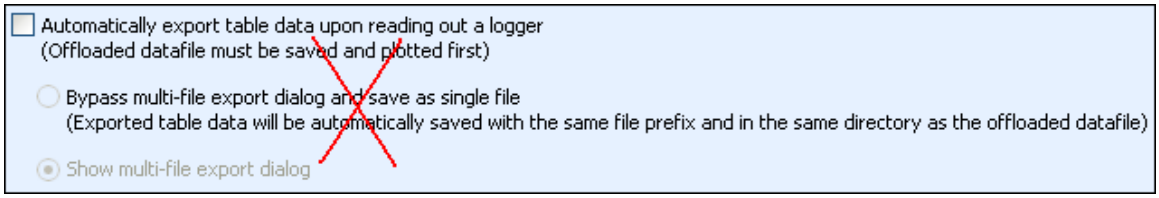
Important: The Bulk Export Tool will not export files properly if the "Show multi-file export dialog" setting is selected in the export preferences. To disable this setting, select Preferences from the File menu in Windows or the HOBOware menu in Macintosh. In the General category, select Export Settings. Make sure "Show multi-file export dialog" is not selected. Even if the "Automatically export table data upon readout of logger" option is disabled, the "Show multi-file export" dialog must not be selected for the Bulk Export Tool to export files properly. Your preferences must look like this:


Automatically export table data upon reading out a logger
(Offloaded datafile must be saved and plotted first)
Bypass multi-file export dialog and save as single file
(Exported table data will be automatically saved with the same file prefix and in the same directory as the offloaded datafile)
Show multi-file export dialog

or this:


Automatically export table data upon reading out a logger
(Offloaded datafile must be saved and plotted first)
Bypass multi-file export dialog and save as single file
(Exported table data will be automatically saved with the same file prefix and in the same directory as the offloaded datafile)
Show multi-file export dialog

but not like this:


Automatically export table data upon reading out a logger
(Offloaded datafile must be saved and plotted first)
Bypass multi-file export dialog and save as single file
(Exported table data will be automatically saved with the same file prefix and in the same directory as the offloaded datafile)
Show multi-file export dialog

for files to export correctly.

Log File

In the directory chosen for the export, a log file is created showing the result of each exported file. It will either indicate the successful export and the resulting file names, or an error message if there was a problem with the export. The final dialog will indicate if there was an error and refer to the log file for more information.

Log File Naming Convention

Export_<day>_<month>_<year>_<hour>_<minute>_<second>.log

Working in Secure Mode: 21 CFR Part 11 Compliance

You can create secure files in HOBOware Pro to comply with 21 CFR Part 11, or simply to add a level of security when working with datafiles. When Secure Mode is enabled, HOBOware Pro begins an audit trail in the logger when you launch it, and adds an encoded digital signature to the new datafile when you read it out.

A digitally signed file, or "secure file," has a filename extension of .hsec (for most U-Series loggers) or .dsec (for station-type loggers).

NOTE: Issues may arise if you do not always use HOBOware Pro in the Secure Mode, if you sometimes use HOBOware Lite, or if you sometimes use a version of HOBOware prior to 2.3.0. See Security Mode Issues.

Enabling Secure Mode (HOBOware Pro Only)

Secure Mode must be enabled to create a secure file.

NOTE: Project (.hproj) and export files are not secure, even if you create them from secure files.

To enable Secure mode:

1. Go to *Preferences* > *General*.
2. Select *Enable Secure Mode*.

When Secure mode is enabled, a padlock icon appears in the lower right corner of the main HOBOware Pro window.

Opening a Secure File

Secure files can be opened with HOBOware Pro 2.3.0 or greater. You can open .hsec files only with HOBOware Lite 2.3.0 or greater.

Every time you open a secure file – even when you are not in Secure mode – HOBOware verifies the encoded digital signature to detect whether the file has been corrupted or tampered with. If even one bit of the data has changed since readout, a warning message will appear when you open the file, and none of the series will be marked as verified.

The padlock icon appears in the legend next to the series that were verified as original data.

In the Details pane, audit trail information is displayed under the Data Verification node for each series. HOBOware Pro automatically obtains the **Launch User** and **Readout User** names from your computer's operating system. To save the **Launch User** name, you must have Secure Mode enabled when you launch the logger.

Verification

- Series that were created by filtering are not verified.
- Series that were created as a result of user input after readout, such as running a data assistant or entering a constant temperature value for pressure or humidity, are not verified.
- Series retain their verification status (and padlock icon) when copied and pasted into other plots.

Verification Failure

If HOBOware cannot verify the digital signature when you open a file, it will display a message that verification has failed. This means that the file has been altered or become corrupted since it was originally saved. It will offer to display the plot if possible, but will not display the padlock icon in the legend or provide signing details in the Details pane. You will still be able to perform typical HOBOware functions on the file.

Security Mode Issues

Issues may arise if you do not always use HOBOware Pro in Secure mode, if you sometimes use HOBOware Lite, or if you sometimes use a version of HOBOware prior to 2.3.0.

Depending on the type of logger, the version of HOBOware that launched the logger, and the version of HOBOware that reads out the logger, the resulting datafile may not be compatible with versions of HOBOware prior to 2.3.0, or you may not be able to read out the logger at all.

- **Launch non-Secure (any version of HOBOware)**
  Readout non-Secure (any version of HOBOware)
  A backward-compatible datafile (.hobo or .dtf) is created.
- **Launch non-Secure (any version of HOBOware)**
  Readout in Secure mode
  A secure file (.hsec or .dsec) is created with an audit trail that lists the readout user, but not the launch user. Secure files are not backward-compatible.
- **Launch in Secure mode;**
  Readout in pre-2.3 version of HOBOware
  Most U-Series loggers: The logger cannot be read out.
  Station-type loggers: A backward-compatible datafile (.dtf) is created.
- **Launch in Secure mode;**
  Readout non-Secure in HOBOware 2.3
  Most U-Series loggers: A datafile (.hobo) is created, but it is not backward-compatible.
  Station-type loggers: A backward-compatible datafile (.dtf) is created.
- **Launch in Secure mode;**
  Readout in Secure mode
  A secure file (.hsec or .dsec) is created with a full audit trail. Secure files are not backward-compatible.

Chapter 5: Other Hardware

HOBOware supports several devices in addition to loggers:

- HOBO U30 Station
- FlexSmart Modules
- Shuttle
- Compact Power and Energy Meter

Working with the HOBO U30 Station (HOBOware Pro Only)

The HOBO U30 Station is designed primarily for use with HOBOlink which allows for continuous logging and transmission of data using mobile network technology. There are, however, some features that are only accessible through HOBOware Pro, and some recommended guidelines for using HOBOware Pro.

Overriding HOBOlink

If you attempt to launch, read out, or check that status of the HOBO U30 Station using HOBOware Pro, you may see a message indicating there is already a live HOBOlink session underway. You can choose to override the HOBOlink connection and use HOBOware Pro instead.

Alternatively, you may see a message indicating the HOBO U30 Station is busy and a HOBOware Pro session cannot begin. Try again in a few minutes.

The readout configuration you define in HOBOlink sets up how frequently the HOBO U30 Station will connect to HOBOlink. For example, if you set a connection interval for 4 hours then the HOBO U30 Station will contact HOBOlink automatically every 4 hours.

There may be circumstances in which you want to override this schedule and contact HOBOlink immediately. For example, you moved the HOBO U30 Station to a different location and you want to make sure it can still connect to HOBOlink, but you don't want to wait four hours until the next connection. Click the Contact HOBOlink button in the Status window to force an immediate connection.

Which Software to Use

The following table details when to use HOBOware Pro instead of HOBOlink.

Launching

It is strongly recommended that launching be done exclusively through HOBOlink Any launch that you have configured with HOBOlink will override the launch parameters set with HOBOware Pro.

Reading out

Readouts are done automatically on a schedule that you set with HOBOlink. Use HOBOware Pro to read out only if you are conducting a test or if you need an immediate readout.

Checking status and signal strength

Check HOBOlink for the latest data, current status, and alarm information.

Open the Status window in HOBOware Pro if you wish to check how powerful the cellular signal for the HOBO U30 Station in the current location. This will help you determine if you need to reposition the station for optimal signal strength.

Configuring the Analog Sensor Port

This can only be done in HOBOware Pro and is accessed through the Launch window. See Configuring FlexSmart Modules and Analog Sensor Ports for details.

Changing the default relay setting or testing the relay

The default relay setting for the HOBO U30 Station is normally open, and can only be changed in HOBOware Pro. You can also use HOBOware Pro to test the relay.

See Controlling the Relay on the U30 Station for details.

Use HOBOlink to set up individual alarms.

Testing individual Smart Sensors

Use HOBOware Pro to test the accuracy of individual Smart Sensors.

When the HOBO U30 Station is not logging,

1. Unplug all Smart Sensors.
2. Plug one Smart Sensor back in.
3. Check the current reading for the sensor in the HOBOware Pro launch window.
4. Repeat with the remaining Smart Sensors.

Additional plotting and analysis of datafiles

HOBOlink displays data read-out from the HOBO U30 Station in line graphs and shows the readings from the last connection. The data is also saved in a datafile that can be downloaded and saved to your computer. You can then open the datafile in HOBOware Pro and view and plot the data in different ways.

Controlling the Relay on the HOBO U30 Station (HOBOware Pro Only)

NOTE: You can only configure the relay on the HOBO U30 Station using HOBOware Pro.

The HOBO U30 Station has a built-in, system-wide relay. The default setting is *deactivated* (open).

Steps

To change the relay:

1. Connect the HOBO U30 Station to the computer with the USB cable.
2. From the **Device** menu, select *Control U30 Relay*.
3. Select *Set default (deactivated) state*.
4. Select either *Open* or *Closed*.

Testing the Relay

To conduct an immediate test of the relay:

1. Connect the HOBO U30 Station to the computer with the USB cable.
2. From the **Device** menu, select *Control U30 Relay*.
3. Select *Activate (close) relay*.

   You should hear a click in the HOBO U30 Station.

4. Select *Deactivate (open) relay*.

   You should hear the click again.

Use HOBOlink to configure alarms for individual sensors, low battery, and low memory.

Changing the State of the U30 Relay Contact

The U30 relay contact is a latching relay that can be configured as either *Normally Open* or *Normally Closed*. The factory-default setting is *Normally Open*. You can change the default relay settings in the **Sensor Alarms** window in HOBOware.

Steps

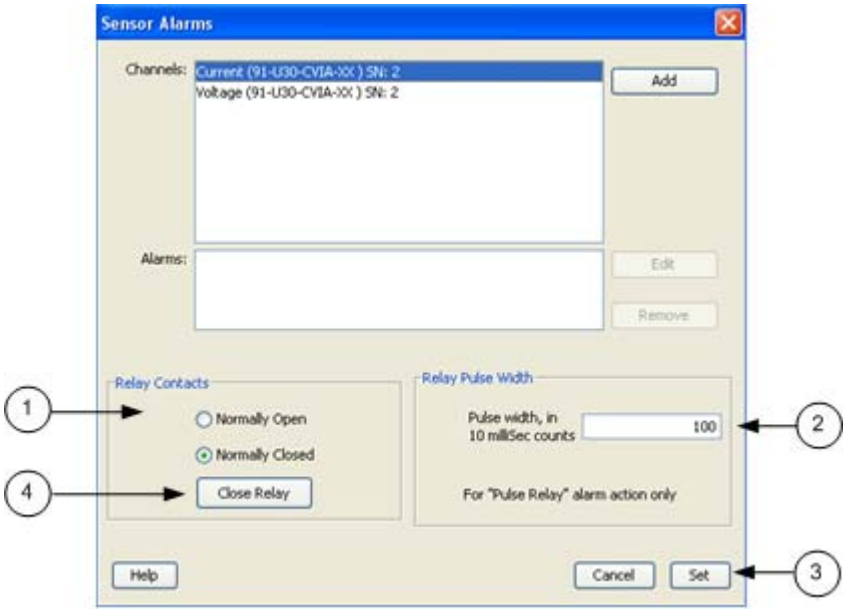
This procedure assumes the U30 Station is connected to a computer running HOBOware.

1. From the **Device** menu, hover over Configure U30 Alarms and select **Configure Alarms** to open the **Sensor Alarms** window,
2. In the **Relay Contacts** section, select *Normally Open* or *Normally Closed*.

   Alternate Method: From the **Device** menu select **Control U30 Relay** > **Set default (deactivated) state** and then select either *Open* or *Closed*.

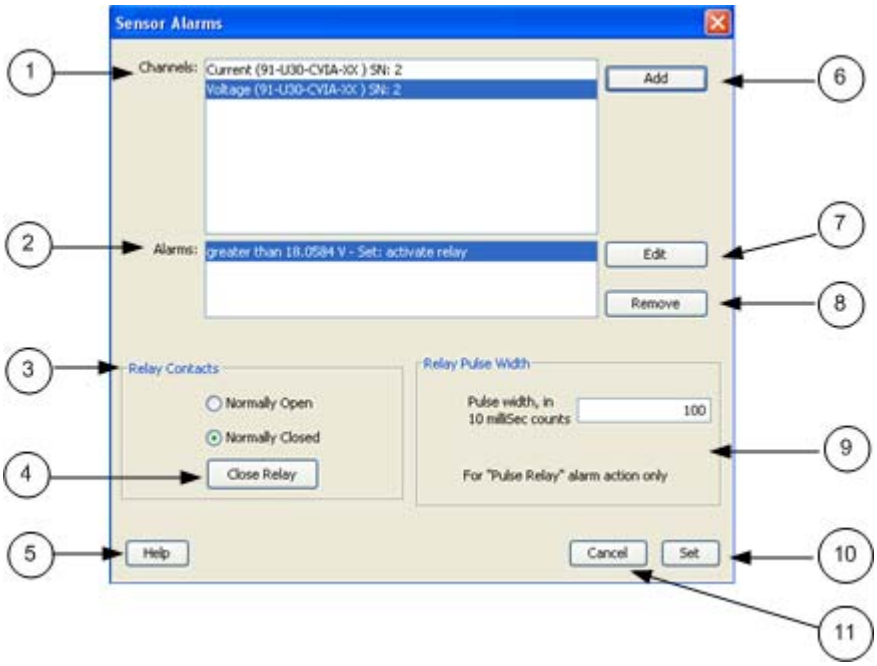
3. If you are setting an **Alarm Action** of *Pulse Relay*, you can set the **Relay Pulse Width**. The default is 1 s.
4. Click **Set** to send the alarm configuration to the U30 Station.
5. To test the relay, click the **Close Relay** or **Open Relay** button (button that appears depends on which state the relay is in). You should hear a click in the HOBO U30 Station. Click the button again to return to the default state. Use a digital multimeter to check for continuity to confirm that the relay is opened and closed as expected.

Alternate Method: From the **Device** menu select **Control U30 Relay >** *Activate Relay*, then select *Deactivate Relay*.



The Alarms Window for the U30/NRC

This topic describes the **Alarms** window for the HOBO U30/NRC. Use the Alarms window to add, edit, or remove U30/NRC alarms.



1. Channels

   This section includes all of the channels that support alarms. Select a channel and click **Add** to configure an alarm.

2. Alarms: This section includes all of the alarms that have been configured.
3. Relay Contacts

   Select if the relay is *Normally Open* or *Normally Closed*. This only applies if the *Alarm Action* (configured in the Alarm Configuration window) is set to Activate Relay or Deactivate Relay.

4. Close Relay

   To test the relay alarm function, click the **Close Relay/Open Relay** button.

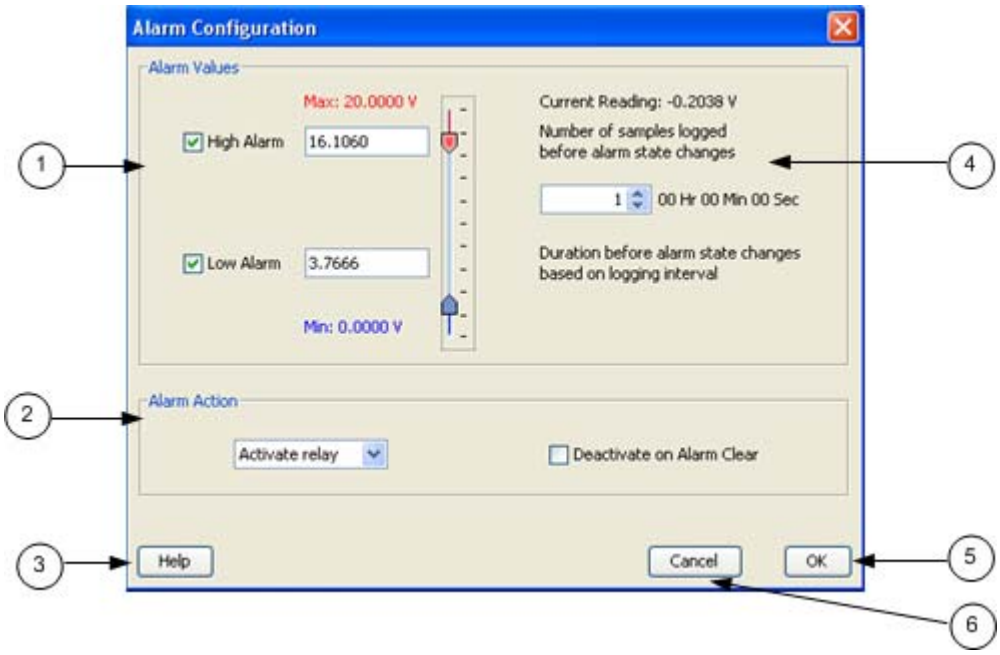
5. Click **Help** to open the Help topic for this window.
6. Click **Add** to open the Alarm Configuration window and configure an alarm.
7. Click **Edit** to open the Alarm Configuration window and edit an existing alarm.
8. Click **Remove** to remove the selected alarm.
9. Relay Pulse Width

   This sets the duration of the Relay Pulse when the **Alarm Action** is set to *Pulse Relay*. The default is 1 second.

10. Click **Set** to send the alarm configuration to the logger.
11. Click **Cancel** to cancel any entries you have made and return to the **Launch** window.

The Alarm Configuration Window for the U30/NRC

Use **Alarm Configuration** window to configure alarm thresholds and actions for the U30/NRC. You access this window from the Alarms window.



1. Alarm Values

Set the Alarm high/low threshold and the number of samples.

Select the check box for the High Alarm and/or the Low Alarm. Enter an alarm in the box(es) or use the sliders. If you enter values manually, the software may adjust them slightly to the nearest values supported by the logger.

If only a high value is entered, the alarm will trigger if the reading exceeds that value. If only a low value is entered, the alarm will trigger if the reading is below that value. If both high and low are entered, the alarm will trigger if the reading falls outside of that range.

You can also set the number of samples that must be displayed before the alarm will be triggered. The sample period is whatever you have configured as the sample rate on the logger.

Note: To avoid unintended activation of the relay contact, set the number of samples to allow for anticipated breaches of the alarm threshold. If the measurement is still out of range when the number of samples is reached, the relay contact will be activated.

2. Alarm Action

Select an action to occur when the alarm is triggered: Activate Relay (Open/Close), Deactivate, Pulse, Toggle, Open, Close.

By default, the relay is deactivated when the alarm clears. To disable this, uncheck the box next to Deactivate on Alarm Clearing.

3. Click **Help** to open the Help for this window.
4. Number of Samples: See Alarm Values above.
5. **OK** to return to the Alarms window.
6. Click **Cancel** to cancel all entries and return to the **Alarms** window.

Configuring FlexSmart Modules/Analog Sensor Ports

This topic describes how to configure an analog sensor port on the HOBO U30 Station or a FlexSmart module in the HOBO Energy Logger.

NOTE: Analog Module/Port Configuration is only available in HOBOware Pro.

Overview

The HOBO Energy Logger is compatible with Onset smart sensors and FlexSmart modules. The HOBO U30 Station uses smart sensors and an optional analog sensor port. FlexSmart modules and the analog sensor port are user-configurable to accommodate a wide range of Onset and third-party sensors. To take advantage of this adaptability, HOBOware Pro lets you configure these modules/ports at launch time, or create and save different configurations to be loaded into the modules/ports whenever needed.

Steps

NOTE: This procedure is for creating a new configuration and sending it to a port. To send an already saved configuration to a port, see Loading a Saved Configuration.

To configure an analog module or port, perform the following steps:

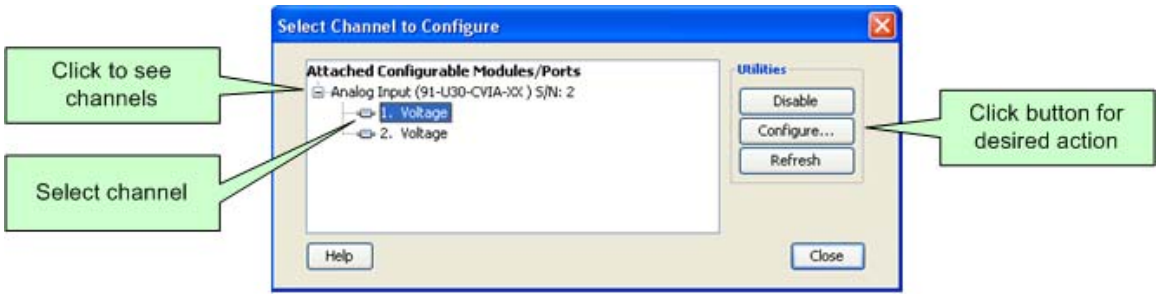
1. From the Launch window click the **Configure** button (or from the **Device** menu, choose *Configure Modules/Ports*).

   If the logger is already logging, you will be warned that the logger will have to be stopped first.

   The **Select Channel to Configure** window will appear showing all configurable Analog Sensors attached to the logger.

   If you are using the HOBO Energy Logger, you can attach additional modules while viewing this window. when done, click **Refresh** to update the module list.

2. Click on the + sign to expand the entry and show the channels.



   Each channel in the module is defined by its channel number (the physical order in the module), the configured channel name, and any location (assigned at launch) defined for this channel in the logger.

   NOTE: The default channel names Voltage and Current are just place holders and either channel can be configured to measure voltage or current. For example, both channels can be used to monitor sensors with 4-20 mA output.

3. Select a channel name and then click the **Configure** button to open the Channel Configuration window.

   NOTE: You can also access the **Channel Configuration** window from the **Launch** window. In the *Channels to Log* section, double-click the module/port name to expand it, click the channel name to select it, and click the **Configure** button.

The Configure Channel window appears.

4. Change any relevant configurable parameters:
5. Save the Configuration (Optional).

   You do not have to save the configuration if you are going to send it to the module/port right away, but you may find it convenient to save the configuration for future use, especially if you have defined custom sensor settings.

   To save this configuration for future use with any module/port of the same type, click **Save**, enter a name for the file and click **Save**.

   By default, the file is saved to the following location with an extension of .hcfg.

   Windows: My Documents\HOBOware\Configs

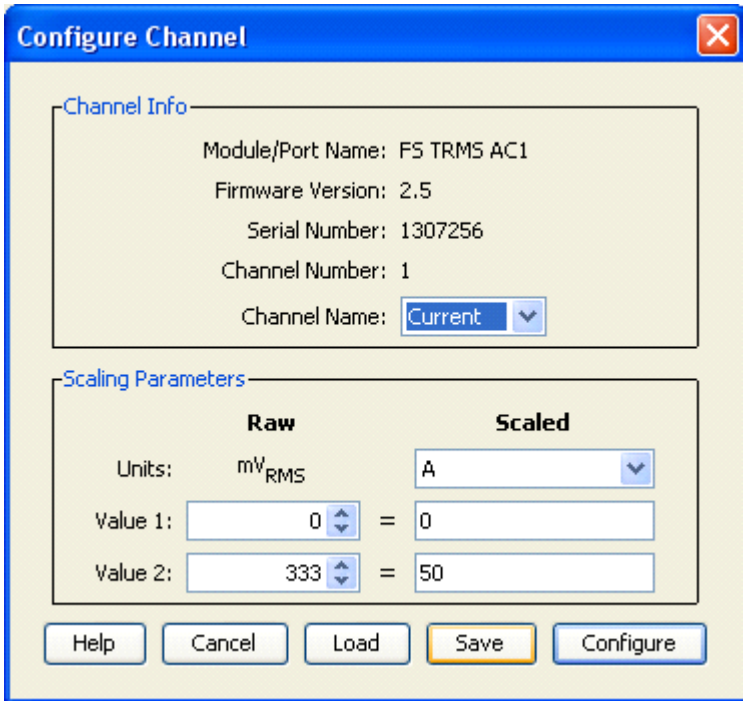
   Mac: Users/<username>/Library/Application Support/HOBOware/Configs

6. To send the currently displayed configuration to the module/port, click **Configure**.

The module will remain in this configuration until you send it a different configuration.

The Configure Channel Window

This topic describes the elements in the Configure Channel window.



Channel Info

Module Name

FlexSmart module model and description.

Firmware Version

Version number of the module's firmware.

Serial Number

Serial number of the module.

Channel Number

Physical order of the channel in the module, starting at 1.

Channel Name

Description, up to 16 characters, of the physical property this sensor will measure. For example, if the external sensor attached to this channel was a flow meter, you could specify **Flow rate** as the measured property. Choose one of the predefined names from the pull-down menu, or choose **Custom** to display a dialog that allows you to define a new name.

If you check the **Save this value for next time** box, the name will be added to the **Channel Name** pull-down menu so that it can be selected in the future when using the same type of module. Saved names are stored as preferences, and are removed when you restore preference defaults.

Excitation Power

Some modules can supply power to attached sensors using the logger's battery.Click the **Set Excitation Power** button to display the Excitation Power dialog. Check the **Excitation Power Used** box to enable excitation power and then select the mode. See Configuring Excitation Power on page 112.

Measurement Type

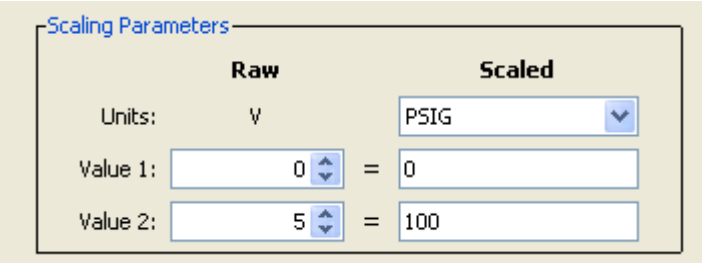
Native measurement recorded by the module, if applicable. Some modules have multiple types of native measurements. For example, the FlexSmart Analog module can measure either current or voltage. If your module offers more than one type of input, select the correct one for your sensor.

Scaling Parameters

See Setting Scaling Parameters on page 111.

Setting Scaling Parameters

This topic describes the settings for the scaling parameters section of the **Configure Channel** pane.



Raw

Units:

This is the type of output the sensor has; either V or mA, corresponding to the type of sensor selected.

Raw Value 1 and Raw Value 2 should be input in these units.

For example, if the external sensor has an output of 4 – 20 mA, the raw units would be in mA.

Value 1

The low raw value given by the external sensor. In the previous example, this would be 4 mA.

Value 2

The high raw value given by the external sensor. In the previous example, this would be 20 mA.

Raw Value 2 must always be greater than Raw Value 1.

Scaled

Units

Choose one of the predefined units from the pull-down list, or choose *Custom* to define units for other types of sensors. See Custom Units below.

Value 1

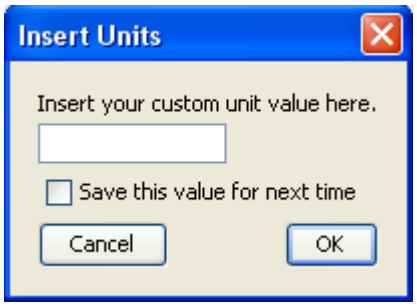
The value you will see on the graph when the sensor reports a raw value equal to Raw Value 1. This value should be entered in the same units that are specified in the **Scaled Units** box.

Value 2

The value you will see on the graph when the sensor reports a raw value equal to Raw Value 2. This value should be entered in the same units that are specified in the **Scaled Units** box.

Custom Units

If you select *Custom* in the **Scaled Units** drop-down list, the following window appears.



Enter a description up to eight characters of the units associated with the physical property to be measured. For example, if the sensor attached to this channel was a flow meter that measured flow rate, you could specify CFS (Cubic Feet per Second) as the scaled unit. If you want to see data in particular SI or US units, you need to enter the appropriate scaling values and units here.

Custom units do not allow for conversion between SI to US units. It is only a reference used to indicate how the module is configured and how the resulting data should be labeled.

Check the **Save this value for next time** box to have this unit name added to the **Scaled Units** drop-down list so that it can be selected in the future when using the same type of module.

Custom unit names are removed when you restore preference defaults.

Click **OK** to return to the **Configure Channel** window.

Configuring Excitation Power

NOTE: Analog Sensor Port Configuration is only available with HOBOware Pro.

Description

You can configure sensor excitation power and warm up on the Analog Sensor Ports. Sensor excitation is a voltage output provided by the HOBO U30 Station to power a sensor that is connected to it. This power may be needed

because the sensor is not self-powered, or because the sensor's power capacity cannot support a long deployment.

When sensor excitation is required, the logger can provide 12 V DC sensor excitation voltage up to 200 mA total for transducers that require external power for proper operation. The excitation voltage has a programmable warm up time and is controlled by the Analog Sensor Port.

A warm up time can be up to 120 seconds. If the warm up required is longer than 120 seconds, or if you are not concerned with battery life, you may choose the **Continuous** option, which will power the sensor for the entire deployment. Then click **OK** to return to the Configure Channel window.

Battery Life

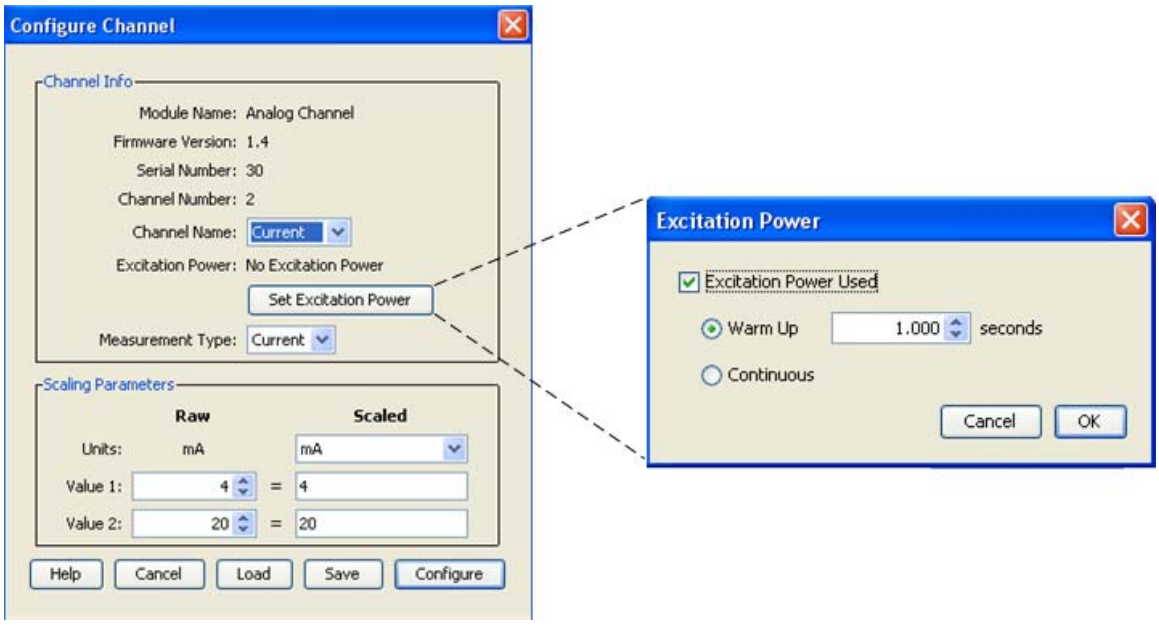
Providing excitation power drastically decreases the logger's battery life. (Consult the logger manual for more information.) In order to save battery power, you may specify the minimum time needed to power the sensor before taking a measurement. For example, if you specify a **Warm Up** of one second and set the logging interval in the logger to one minute, the logger will power the external sensor for one second, log data and then turn off the excitation power for the next 59 seconds.

Always enable the logger's internal battery channel when logging with excitation power. If the battery becomes too low to provide excitation power, excitation power is turned off, but logging continues as long as the battery can power the logger. This will cause the further readings on that channel to become inaccurate. If you are logging the internal battery channel when this happens, an Excitation Off event will be shown in your datafile to mark the point at which excitation power was disabled.

Configuration

You configure Excitation Power from the Configure Channel window.

1. Click on the Set Excitation Power button to open the Excitation Power window.



2. Check off the Excitation Power Used box.
3. Select the Mode. If the Mode is Warm Up , select the warm up time in seconds.
4. Click OK.

Modes

Warm up

When in Warm up Mode the logger supplies excitation power for a brief, user-programmable period prior to each measurement. This mode allows you to select the minimum warm up time needed to allow for sensor stabilization, while conserving battery power.

For example, if you specify a warm up of one second and set the Logging Interval to one minute, the HOBO U30 Station will power the external sensor for one second, log a measurement, and then turn off the excitation power for the next 59 seconds. The warm up time can be up to 120 seconds.

If the warm up time selected is greater than the logging interval selected, the logger will interpret the excitation mode as continuous.

Continuous

When in Continuous Mode the logger supplies constant excitation power to the sensor for the entire duration of the deployment. This mode will result in reduced battery life. Continuous mode is required if the sensor needs more than two minutes of warm up time.

The Analog Sensor Ports begin functioning when logging begins. When the ports are functioning correctly, the Active indicator LED on the port blinks once per logging interval to indicate that a successful measurement has been made. The Ex. On indicator LED will also be lit when excitation is enabled.

Loading a Saved Configuration

NOTE: Analog Sensor Configuration is only supported with HOBOware Pro.

Once you have created and saved a sensor configuration, you can load it into any module/port of the same type.

For example, a configuration for a FlexSmart TRMS module can be loaded into any other FlexSmart TRMS module, but not into a FlexSmart Analog module.

Steps

1. *From the* **Device** *menu, choose* **Configure Modules/Ports***.*
2. Click the **Load** button.

   The resulting dialog lists all defined configurations in the currently selected folder that are compatible with the module/port.

3. Choose a configuration:

   If you are experiencing problems with the module, you can reset the channel to its default configuration. Select *Use Default Module Configuration*, then click **Continue**.

   To use one of the defined configurations, click the button next to *Use Configuration File*, then click the button next to the name of the configuration file you want to use. Then click **Continue**.

4. To send the currently displayed configuration to the module/port, click **Configure**.

   The module/port will remain in this configuration until you send a different configuration to it.

Resetting a Module to the Default Configuration

If you are experiencing problems with a module, you can reset it to the default configuration.

Steps

1. From the **Device** menu, choose **Configure Modules/Ports**.
2. In the **Select Channel to Configure** window, select a channel and click **Configure**.
3. In the **Configure Channel** window, click the **Load** button.

   The **Load Configuration** window appears. This lists all defined configurations in the currently selected folder that are compatible with the module/port.

4. Choose a configuration.

   To use one of the previously saved configurations, click the button next to *Use Configuration File*, then click the button next to the name of the configuration file you want to use.

   To get a file from a different location, click on **Choose Folder** and browse to the desired directory.

   NOTE: If you are experiencing problems with the module, you can reset the channel to its default configuration by selecting *Use Default Module Configuration*, then click **Continue**.

5. Click **Continue**.

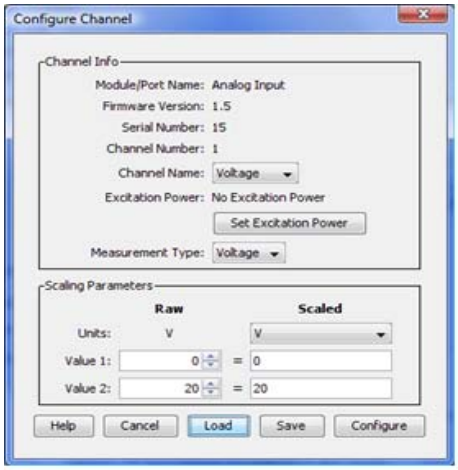
   This will take you back to the **Configure Channel** window.

6. To send the currently displayed configuration to the module/port, click **Configure**.

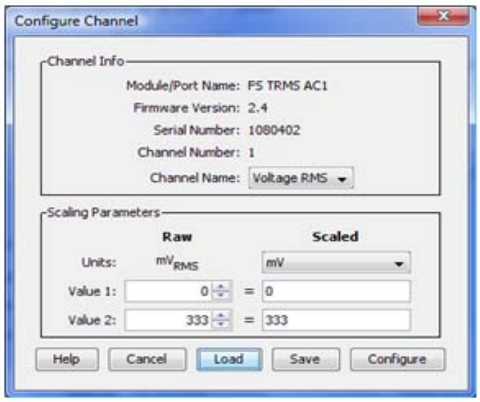
   The module/port will remain in this configuration until you send a different configuration to it.

Default Module Configurations

The following screen shots show the default configuration for the analog modules. The configuration is the same for both channels.



CVIA Module



TRMS Module

Working with a Shuttle (HOBOware Pro Only)

NOTE: HOBO Shuttles require HOBOware Pro.

HOBO shuttles provide a convenient way to read out and relaunch loggers in the field. The HOBO U-Shuttle features a text display and is compatible with all loggers that can be used with HOBOware Pro. The HOBO Waterproof Shuttle communicates with HOBOware-compatible optic loggers.

NOTE: To use a U-Series logger (other than the HOBO U30 Station) with a shuttle, the logger must first be launched with HOBOware version 2.2 or higher at least once. Consult the shuttle user guide for details.

HOBOware Pro allows you to launch these shuttles, collect logger data in the field, and offload the datafiles from them.

- Shuttle Management window
- Offloading Files from a Shuttle
- Saving Files from a Shuttle
- Deleting shuttle files

For detailed instructions refer to the user guide that came with your shuttle.

Shuttle Status

To check the shuttle status, go to the Shuttle Management window.

U-Shuttle Firmware Updates

To update your U-Shuttle's firmware, download the firmware update file from the website, then choose **Update U-Shuttle Firmware** from HOBOware Pro's Help menu.

The Shuttle Management Window

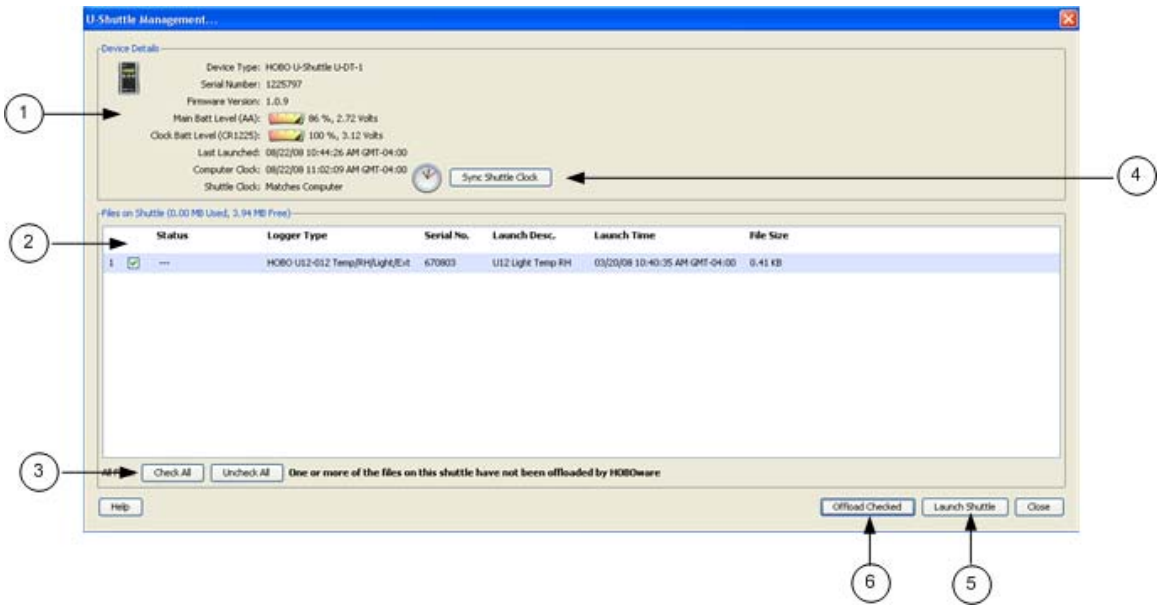
This topic describes the fields in the Shuttle Management window for the U-Shuttle and Waterproof Shuttle.

NOTE: You can only offload HOBO Shuttles using HOBOware Pro.

U-Shuttle Battery Life

While the Shuttle Management window is displayed, the U-Shuttle remains on battery power for up to an hour. After one hour, or any time the U-Shuttle's main battery level becomes low, the window closes and the shuttle powers down. To further conserve the shuttle's battery life, you should close the window, disconnect the shuttle, and turn the shuttle off as soon as you finish working with it.

The Waterproof Shuttle is powered by the USB port, and does not need to be turned off.



1. Device Details

***Device Type*: Shuttle model and description.**

Serial Number: Serial number of the shuttle.

Firmware Version: Version number of the shuttle's firmware.

Main Batt Level (AA)(U-Shuttle only)

Condition of the shuttle's main batteries. Consult the *U-Shuttle User's Guide* for specifics on battery capacity.

Clock Batt Level (CR1225) (U-Shuttle only)

Condition of the battery that provides backup power to the shuttle's clock. Consult the *U-Shuttle User's Guide* for details.

Battery Level (Waterproof Shuttle only)

Condition of the shuttle's batteries when you opened the Waterproof Shuttle Management window. If the batteries are low, remember to change them before going into the field. Consult the *Waterproof Shuttle User's Guide* for specifics on battery capacity.

Last Launched

Date, time, and offset to Greenwich Mean Time (GMT, also known as UTC) when the shuttle was last launched.

Computer Clock: Time reported by the computer's clock.

Shuttle Clock

Status of the shuttle's clock in relation to the computer's clock. If the difference is more than five seconds, the shuttle clock label and icon will flash red. The shuttle's clock is synchronized to the computer when you launch the shuttle or press the **Set Shuttle Clock** button.

2. Files on Shuttle

This panel lists the logger datafiles that are available to be offloaded from the shuttle. If the shuttle is empty, this will say "No Files Available on Shuttle."

Status: Message that describes the state of the datafile on the shuttle. When HOBOware Pro is offloading a file from the shuttle, the status message is replaced by a progress bar.

> For the U-Shuttle only, the status message **AWAITING OFFLOAD** appears when HOBOware Pro is offloading files from the shuttle, and **FINISHED** after each file is offloaded.
>
> For the Waterproof shuttle only, files have the status message **OFFLOADED** only if the file has been offloaded from the shuttle and saved as a datafile. If the file has not been offloaded, or it has been offloaded but not saved, its status is **NOT OFFLOADED**.

Logger Type: Model and description of the logger that logged the data in this file.

Serial No.: Serial number of the logger that logged the data in this file.

Launch Desc.: Description entered when the logger was launched. This description will be the default datafile name.

Launch Time: Date, time, and offset to Greenwich Mean Time (GMT, also known as UTC) when the shuttle was last launched.

File Size: Actual size of the datafile.

3. Check All/Uncheck All

Use these buttons to check or uncheck all of the files on the shuttle to be offloaded.

4. Synch Shuttle Clock

Click this button to synchronize the shuttle's clock to the computer clock without launching the shuttle. (Exit HOBOware Pro if you need to update the computer's clock first.)

Important: If the difference between the shuttle's clock and the computer's clock is more than 59 minutes, the *Set Shuttle Clock* button is not available. You must launch the shuttle to correct the time difference.

5. Launch Shuttle

Click this button to Launch the shuttle. Launching the shuttle will delete all datafiles and reset the shuttle's clock.

Re-Launching the shuttle also repairs a corrupted header.

6. Offload Checked

Click this button to offload all checked files to the computer.

Offloading and Saving Shuttle Files

NOTE: HOBO Shuttles require HOBOware Pro.

To offload datafiles from a shuttle to a computer:

1. Connect the shuttle to the computer.
2. Choose **Manage Shuttle** from the Device menu.

   Alternate Method: To quickly offload all of the new datafiles that are on the shuttle, choose **Readout** from the **Device** menu.

3. Choose files to offload:

   U-Shuttle
   All files are selected by default if the shuttle has not been offloaded before. To uncheck all files, click the **Uncheck All** button. To uncheck individual files, click the checkbox next to each file.

   Waterproof Shuttle

   Only the files that have not previously been offloaded *and saved* are selected by default. To check or uncheck individual files, click the checkbox next to each file. Use the **Check All** and **Uncheck All** buttons next to **Previously Offloaded Files** and **New Files (Not Offloaded)** to control the selection of these groups of files.
   To automatically delete files from a Waterproof Shuttle after you offload and save them, enable the **Delete Contents Upon Offload** option. Files will be automatically deleted only after you successfully save them to the host computer.

4. Offload Files

   Click the **Offload Checked** button to begin offloading the datafiles.

   Once offloading begins, the **Offload Checked** button will change to **Cancel Offload**. When offloading is complete, the **Files on Shuttle** panel on the Shuttle Management window will change to a **Files Offloaded From Shuttle** panel.

   You can now save the files to your computer.

Saving Files from a Shuttle

Before you can save files, you must offload them from the shuttle.

Saving Files

The illustration below shows the parts of the Shuttle Management window related to saving files.

1. Save Folder

The default location for the save is indicated in the **Save Folder** box. To change to another location, click **Choose** and browse to the location

2. Automatically Open Files

To have the folder automatically open on the desktop after the files are saved, check:

Windows: *Open Folder in Windows Explorer after Save*.

Mac: *Open Folder in Finder after Save*.
3. Choose files to save.

By default, all of the files you offloaded will be selected for saving.

To uncheck individual files, click the checkbox next to each file.

To uncheck all files, click the **Uncheck All** button.

To save all files (if you have already unchecked a few), click the **Check All** button.

4. Datafile Name

Enter a new name if desired.

5. Cancel Save

To exit without saving any files, click **Cancel Save**.

6. Save Checked

Click this button to save all checked files.

The files are saved to the specified folder.

Deleting Files from a Shuttle

NOTE: HOBO Shuttles require HOBOware Pro.

NOTE: If the **Files Offloaded From Shuttle** panel is displayed, you must save the offloaded files (or cancel without saving) before deleting any files.

Deleting Files from a U-Shuttle

To delete all files from a U-Shuttle, whether they have been offloaded and saved or not, click the **Launch Shuttle** button on the Shuttle Management window to launch the shuttle. You cannot delete individual files from a U-Shuttle.

NOTE: Because the shuttle's header information occupies 64 KB, 3.94 MB is the maximum amount of free memory available on a U-Shuttle.

Launching also resets the shuttle's clock and its **Last Launched** time.

Deleting Files from a Waterproof Shuttle

To automatically delete files after you offload and save them, enable the **Delete Contents Upon Offload** option before clicking **Offload Checked**. Files will be automatically deleted only after you save them.

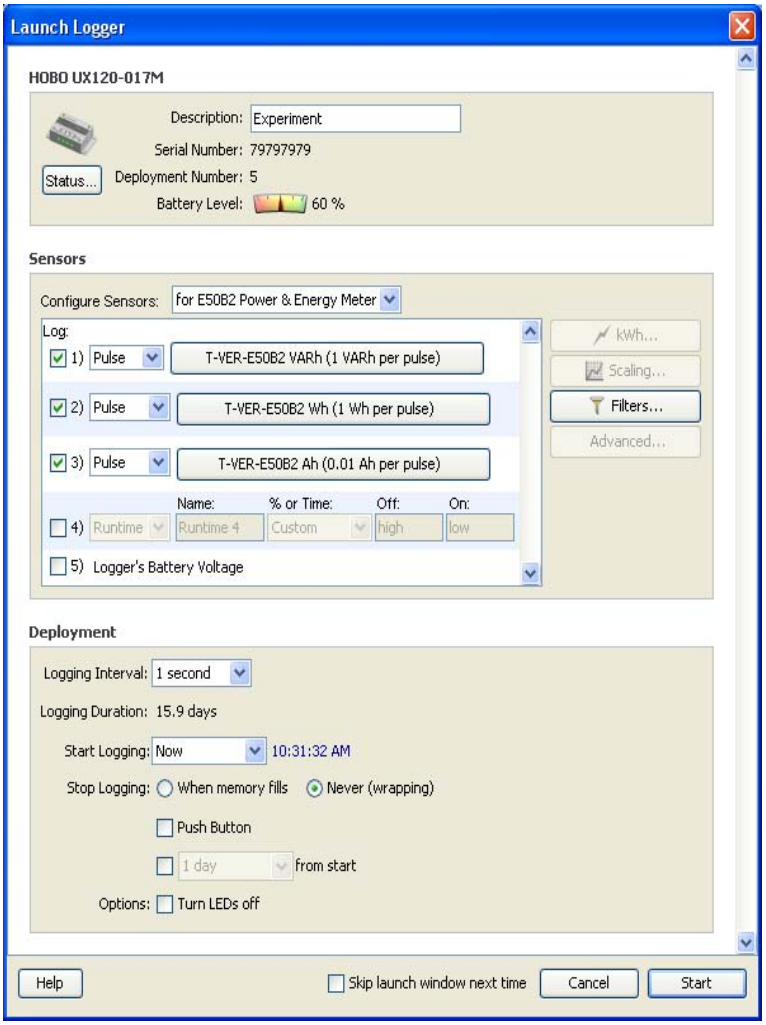
To select specific files to delete, click the checkbox for each unwanted file on the Shuttle Management window. To select all of the files that have already been offloaded, click the **Check All** button next to **Previously Offloaded Files**. Then click **Delete Checked**.

To delete all files from a Waterproof Shuttle, whether they have been offloaded or not, click the **Launch Shuttle** button on the Shuttle Management window to launch the shuttle. This will also reset the shuttle's clock and its **Last Launched** time.

Configuring Loggers with the E50B2 Power & Energy Meter

When the E50B2 Power & Energy Meter (T-VER-E50B2) is combined with a supported logger, there is a custom setting available to quickly configure the applicable channels or sensor types. To access this setting:

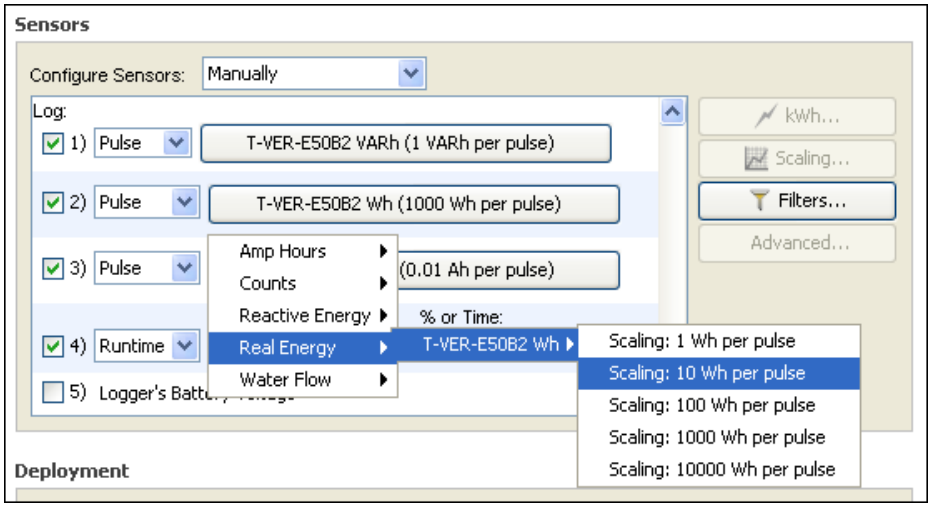
1. Connect a logger to the computer that supports the meter, such as the HOBO 4-Channel Pulse Input Data Logger (UX120-017x), and select Launch from the Device menu.
2. In the Launch Logger window, select "for E50B2 Power & Energy Meter" in the Configure Sensors drop-down list. The first three sensors, or data channels, listed will automatically be updated to display the appropriate settings for the E50B2 Power & Energy Meter as shown below.



When these settings are selected, the logger will record the default values from the Onset Power Meter. This means that when you read out the logger, the first three data channels will record the following by default:

- Reactive energy, at a rate of 1 pulse equal to 1 VARh
- Real energy, at a rate of 1 pulse equal to 1 Wh
- Amp hours, at a rate of 1 pulse equal to 0.01 Ah

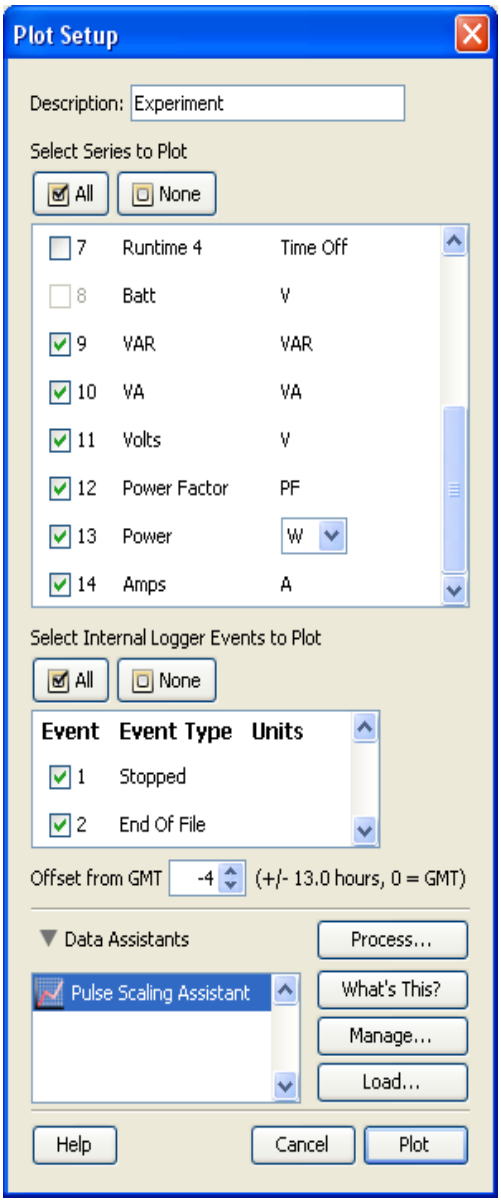
You can change the scaling for these three channels. Click one of the channel or sensor buttons and select the measurement type, sensor name, and then scaling factor. The example below shows changing scaling on channel 2 after clicking the "T-VER-E50B2 Wh (1000 Wh per pulse)" button. Note: The scaling factor must be the same for VARh and Wh channels. WARNING: If you change the default scaling parameters, you must also change the settings on the Onset Power Meter. Similarly, if you change the scaling on the device itself, you must also change the scaling in the software to match. Refer to the *Compact Power and Energy Meter (T-VER-E50B2) Full Install Guide* for details on how to change the settings on the device.



3. Select any other Launch settings as desired and then click Start to launch the logger with the Onset Power Meter settings (note that the Start button name changes depending on when you chose to begin logging).

Additional Series for Plot Setup

Datafiles from a logger with Onset Power Meter settings not only list logged sensor data, but they also contain additional derived series automatically calculated in relevant units. HOBOware uses the logged data from each of the three enabled sensors (reactive energy, real energy, and amp hours) to derive, or calculate, up to six additional data series that you can plot. These derived series are numbers 9 through 14 in the Plot Setup dialog box example below. Select the series you wish to view and then click Plot. These series are always available for plotting any time you open the datafile.



The following table lists the calculations for all derived series. It also specifies which of the three Onset Power Meter sensors/channels must be enabled at launch time for these series to be available upon readout.

Derived Series Name	Calculated By	Requires these Channel(s) to be Enabled at Launch
VAR	VARh / (logging interval in seconds / 3600)	Reactive Energy (VARh)
VA	VAh / (logging interval in seconds / 3600), where VAh = SQRT (Wh^2 + $VARh^2$)	Reactive Energy (VARh) and Real Energy (Wh)
Volts (V)	VAh / Ah, where VAh = SQRT (Wh^2 + $VARh^2$)	Reactive Energy (VARh) and Amp Hours (Ah)
Power Factor (PF)	Wh / VAh, where VAh = SQRT (Wh^2 + $VARh^2$)	Reactive Energy (VARh) and Real Energy (Wh)
Power (W)	Wh / (logging interval in seconds / 3600)	Real Energy (Wh)
Power (kW)	Wh / (logging interval in seconds / 3600) / 1000 OR W / 1000	Real Energy (Wh)
Amps (A)	Ah / (logging interval in seconds / 3600)	Amp Hours (Ah)

Chapter 6: Managing a HOBO Data Node Network

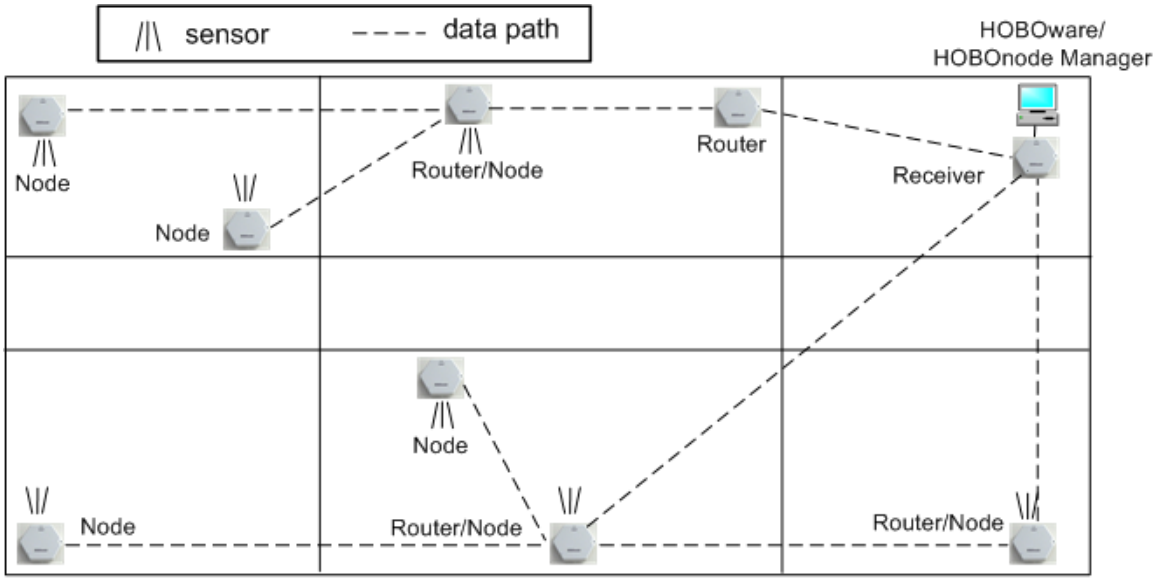
HOBO Data Nodes: System Overview

HOBO data nodes can be used to measure a wide variety of parameters including temperature, humidity, voltage, current and pulses. Sensor data is transmitted by the nodes to the HOBO data receiver)and viewed and plotted using HOBOnode Manager, a component of HOBOware Pro. You may also need to add HOBO data routers (ZW-ROUTER) to your network to overcome distance limitations or obstructions.

Maximum Devices Per System: 100

Maximum Data Nodes per Router (either a ZW-ROUTER or a data node routing data): 12

Routing data between data nodes allows for continuous connections and reconfiguration around broken or blocked paths by hopping from node to node until the destination is reached. This form of network is very reliable because it is self-healing and can still operate when a data node breaks down or a connection goes bad by reorganizing itself. To maximize network performance and reliability, plug all data nodes into an AC power outlet.



Device Type	Functionality
Receiver	Connects to your computer and receives data from nodes.
Router	Routes data from nodes to the receiver. Used for routing only.
Router/ Node	If a node is connected to AC power (**before inserting batteries**), it is a router node. It records measurements from sensors and sends data to receiver and can also route data from other nodes.
Node	If a node is has battery power only, it is a node. It records measurements from sensors and sends data to receiver, but it **cannot** route data from other nodes.

By default, sensors take measurements once per minute. You can change this by changing the Logging Interval.

By default, data nodes transmit data to the receiver every 10 minutes. You change this by editing the Connection Interval.

See Changing the Logging Interval and Connection Interval (page 194).

Hardware Components

A HOBO data node network consists of the following components:

HOBO data receiver

The HOBO data receiver forms the root of the network. Each network has one receiver that performs the following functions:

- Forms the network,
- Stores network information,
- Collects measurement data from nodes and transmits measurement data to HOBOnode Manager, and
- Sends configuration commands to the data nodes.

NOTE: The HOBO data receiver may be referred to simply as the "receiver" in the documentation.

HOBO data nodes

HOBO data nodes record data using either internal or external sensors. The data is then transmitted across the network back to the receiver. Data nodes may also double as routers when they are powered by an AC adapter.
NOTE: A HOBO data node may be referred to as a "node" in the documentation.

HOBO data router (ZW-ROUTER)

The ZW-ROUTER routes data from nodes to the receiver or another node or router. Use this device for routing data from other nodes only.

External sensors

Nodes do not supply power to external sensors. For external sensors that require power and are connected directly to a node, you must supply power to the sensor.

For external sensors outputting more than 2.5 v, you must use an adapter cable: ADAP5 or ADAP10. For output other than 2.5, 5, or 10 v, you must perform some calculations to analyze the recorded data.

Use the appropriate cable to connect the sensor to the data node and select the corresponding cable in the Sensor Type drop-down when configuring the sensor in HOBOnode Manager.

HOBOnode Manager

HOBOnode Manager is a component within HOBOware that you use to configure wireless data nodes. You access HOBOnode Manager from the Device menu in HOBOware Pro.

Interaction with HOBOware

- HOBOnode Manager is a component of HOBOware Pro. A separate icon for HOBOnode Manager appears in your task bar when it is running.

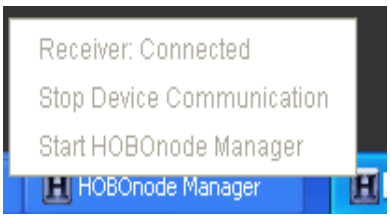
- You cannot access HOBOnode Manager if you have a HOBOware window open (such as Launch or Status).
- You can close HOBOnode Manager and leave HOBOware running.
- You cannot close HOBOware and leave HOBOnode Manager running.

- You can close both HOBOware and HOBOnode Manager and keep device communication running. A HOBOware icon appears in your system tray when device communication is running.

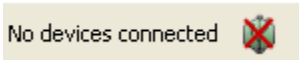
Device Communication

This component controls communication between the nodes and HOBOnode Manager. Unless you stop it, device communication continues even if you close HOBOnode Manager or HOBOware. When you re-open HOBOnode Manager, it will take some time for the cached data to be retrieved and for the real-time plots to reflect all stored data.

When device communication is running, a HOBOware icon appears in your system tray. Right-click (or left-click on a Mac) on the icon to access the Device Communication menu, which shows the Receiver Status, and has options for Stopping Device Communication and Starting HOBOnode Manager.



In addition, an icon appears in the status bar at the bottom of the main HOBOware window to show whether the receiver is currently connected. If the receiver is connected, you'll see this

in the bottom right corner of the HOBOware window. If the receiver is disconnected, you'll see this 

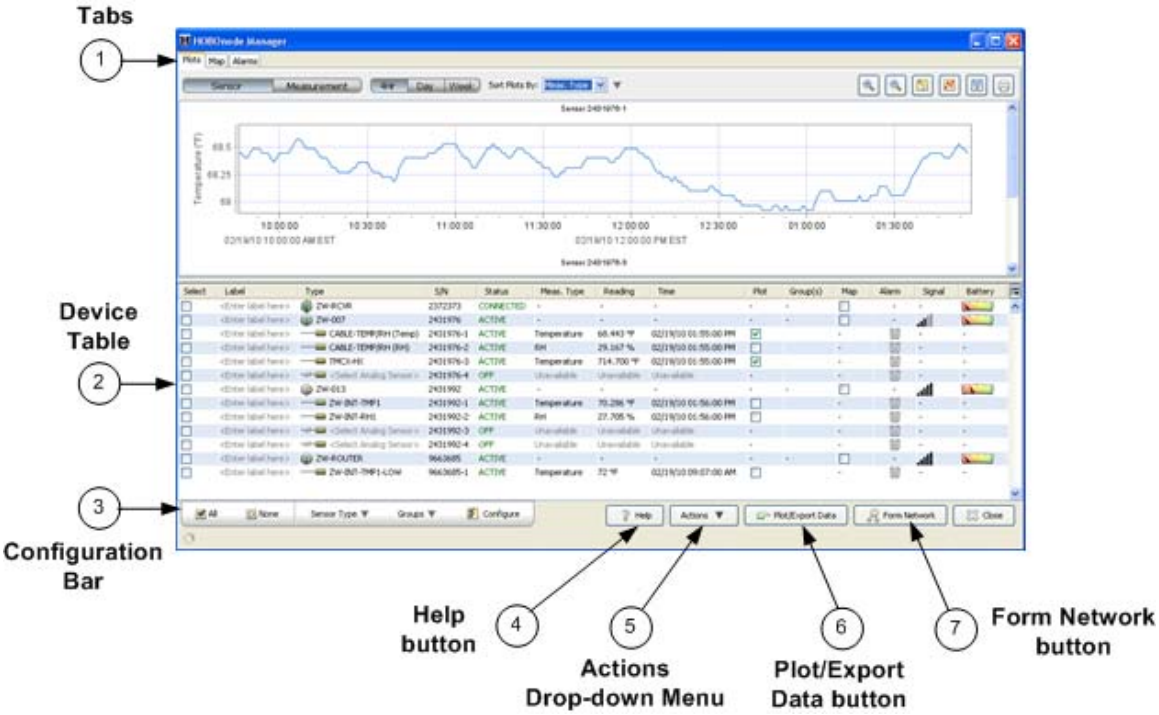
instead. **Note:** The "No devices connected" message next to the receiver icon does not refer to devices within your data node network; it indicates that other devices, such as loggers and shuttles, are not currently connected. If you were to connect a logger or a shuttle, that message is updated independently of the receiver icon.

Using the Heartbeat monitor alarm, you can periodically verify that the device communication is still running. See Enabling a Heartbeat Alarm (page 155).

NOTE: If you update your HOBOware software, you must stop device communication to perform the installation.

A Tour of HOBOnode Manager

This topic provides a description of the elements in HOBOnode Manager.



1. Tabs: Click the tabs to toggle between the Plots (page 132), Map (page 131), and Alarms (page 133) pages.
2. Device Table

The Device Table shows the receiver and all nodes and sensors in your network, and includes information such as Status, Measurement Type, and Readings. From the Device Table you can configure the receiver and nodes, add real-time plots, configure alarms, and add nodes to the Network Map.

3. Configuration Bar

Use the Configuration Bar to perform operations on a node or sensor, such as applying sensor type to external sensors, apply groups to sensors, or opening the Configure window.

5. Help button - Click the Help button to open the on-line Help. Click the *Open topic with navigation* link to open the full Help table of contents.
6. Actions Drop-down Menu

Includes the following actions you can perform on your network:

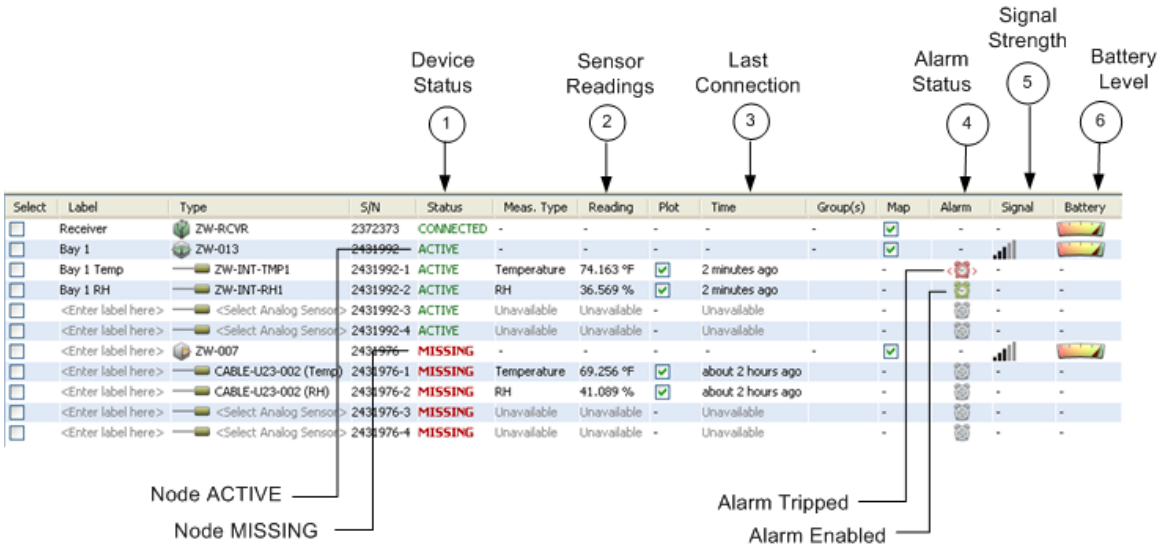
- Print Device Table - Select the option to print the Device Table.
- Edit HOBO Data Node Preferences - Select to open the preferences for data nodes.
- Create New Deployment - Select this option to create a new data node network deployment.

7. Plot/Export Data button - Click the Plot/Export Data button to open the Plot/Export Wireless Data window (page 179).
8. Form Network button

Click the **Form Network** button to add nodes to your network. See Adding Nodes to your Network (page 146).

Monitoring your Network

Use the Device Table to monitor the status of the devices in your network. You can also monitor your network using the Network Map (page 131).



Select	Label	Type	S/N	Status	Meas. Type	Reading	Plot	Time	Group(s)	Map	Alarm	Signal	Battery
☐	Receiver	ZW-RCVR	2372373	CONNECTED	-	-	-	-	-	☑	-	-	
☐	Bay 1	ZW-013	2431992	ACTIVE	-	-	-	-	-	☑	-		
☐	Bay 1 Temp	ZW-INT-TMP1	2431992-1	ACTIVE	Temperature	74.163 °F	☑	2 minutes ago		-		-	-
☐	Bay 1 RH	ZW-INT-RH1	2431992-2	ACTIVE	RH	36.569 %	☑	2 minutes ago		-		-	-
☐	<Enter label here>	<Select Analog Sensor>	2431992-3	ACTIVE	Unavailable	Unavailable	-	Unavailable		-		-	-
☐	<Enter label here>	<Select Analog Sensor>	2431992-4	ACTIVE	Unavailable	Unavailable	-	Unavailable		-		-	-
☐	<Enter label here>	ZW-007	2431976	MISSING	-	-	-	-	-	☑	-		
☐	<Enter label here>	CABLE-U23-002 (Temp)	2431976-1	MISSING	Temperature	69.256 °F	☑	about 2 hours ago		-		-	-
☐	<Enter label here>	CABLE-U23-002 (RH)	2431976-2	MISSING	RH	41.089 %	☑	about 2 hours ago		-		-	-
☐	<Enter label here>	<Select Analog Sensor>	2431976-3	MISSING	Unavailable	Unavailable	-	Unavailable		-		-	-
☐	<Enter label here>	<Select Analog Sensor>	2431976-4	MISSING	Unavailable	Unavailable	-	Unavailable		-		-	-

1. Device Status - This column indicates the status of the device: ACTIVE, or MISSING.
2. Sensor Readings - This column shows the current reading for the sensor.
3. Last Connection - The last time the data node connected to the receiver.
4. Alarm Status - The alarm icon in this column indicates the status of the alarm.

   Grey - No alarm configured

   Green - Alarm enabled

   Red - Alarm Tripped

5. Signal Strength

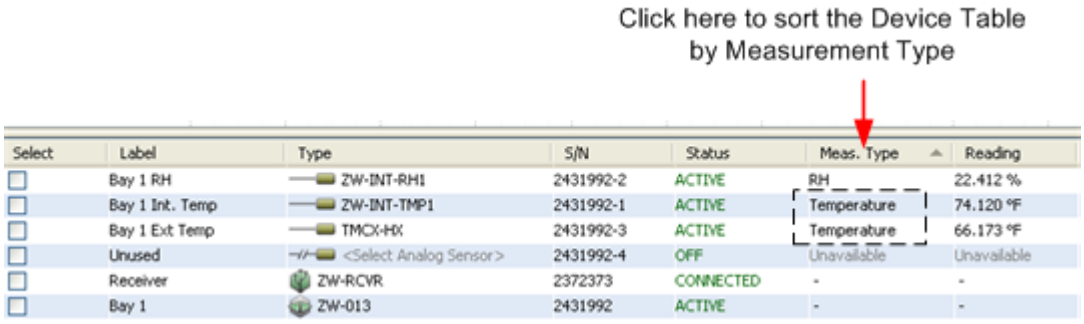
   This column indicates the signal strength of the wireless connection between the node and the receiver or the nearest router.

6. Battery Level - Indicates the strength of the batteries in the device.

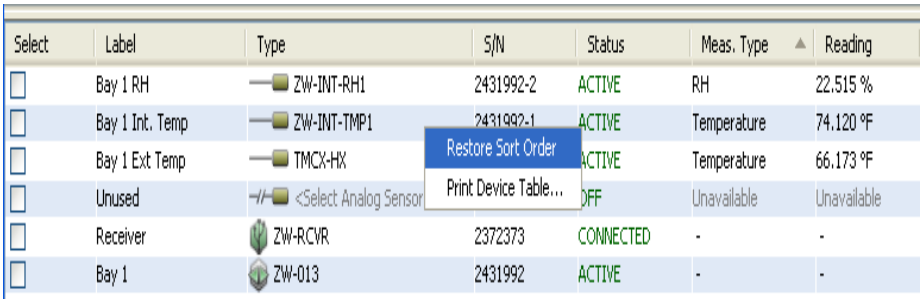
For information on other columns in the Device Table, see The Device Table (page 202).

Sorting Devices

You can change the order of devices in the table by clicking the column header for the column you want to sort on. For example, to group all temperature sensors together, click on the Meas. Type column header.

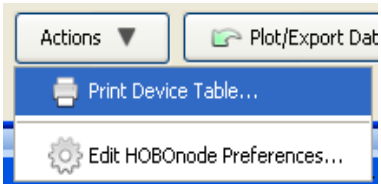


To restore the original (default) sort order, right-click anywhere in the Device Table and select Restore Sort Order.



Printing the Device Table

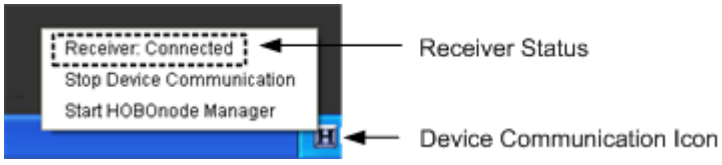
To print the Device Table, click the **Actions** button at the bottom of the HOBOnode Manager window and select Print Device Table.



You can also print the Device Table by right-clicking anywhere in the Device Table and selecting Print Device Table.

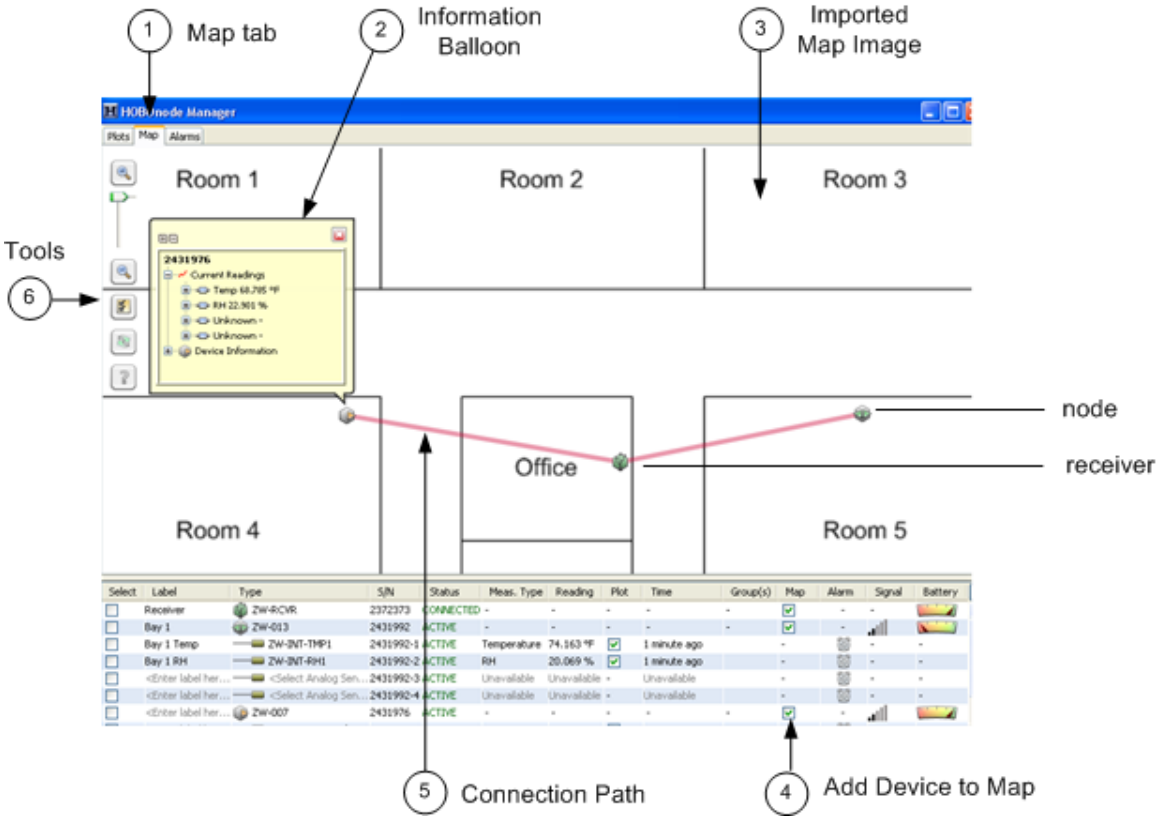
Device Communication

If Device Communication is running, the Device Communication icon will appear in your system tray and the Receiver status will be *Connected*. You can also monitor Device Communication using a Heartbeat Alarm (page 155).



The Network Map

Place icons on the Network Map to help you keep track of your devices. You can expand Information Balloons on the device to view status information and sensor readings. You can import a custom background image, such as a floor plan.



1. Map Tab

To view the Network Map, click the Map tab.

2. Information Balloons

Click on a device in the Network Map to open a pop-up that shows current readings and other device information. To have pop-ups appear automatically, click the Configure Map icon and select *Show Information Balloon when adding new data nodes and on startup*. You can also how much information is included in the balloon. See Configuring the Network Map (page 175) for more information.

3. Imported Map Image

To customize your map background image, see Customizing the Network Map Background (page 177).

4. Add Device to Map

To add a device to the map, check the Map box in the Device Table and then click in the map where you want to place the icon.

5. Connection Path

Lines on the map show the path each device takes to the receiver.

You can monitor the communication between a data node and the data receiver by checking the connection paths between devices. If a device has missed a scheduled connection, the path will become a dotted line.

To change the path color, see Configuring the Network Map (page 175).

6. Tools

   - Zoom

     Use the zoom tools to zoom in and out of the map.

   - Configure Map

     Click the Configure Map button to open the Configure Map window. See Configuring the Network Map (page 175).

   - Refresh Network Paths

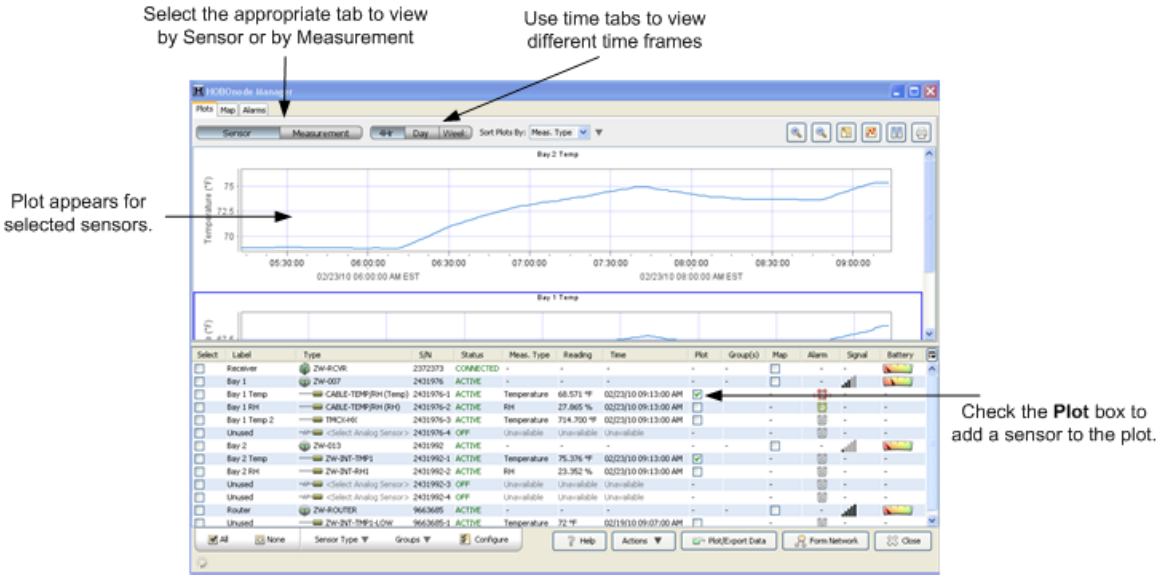
     The path that a device takes to the data receiver may change due to a node being moved or because the original path was obstructed. To see the latest paths, click the **Refresh Network Paths** button.

Alarms

If an alarm has tripped on a node, the node on the network map will have a red ring around it.

Real-Time Plots

In the plots window you can view sensor data in real-time plots. For more information, see Viewing Real-Time Plots (page 178).


Select the appropriate tab to view by Sensor or by Measurement
Use time tabs to view different time frames
Plot appears for selected sensors.
Check the **Plot** box to add a sensor to the plot.

Alarms

Alarm Types

There are two categories of alarms in HOBOnode Manager:

- Sensor Alarms

  You can configure alarms to be notified if a sensor reading is out of a configured range. See Adding a Sensor Alarm (page 152).

- System Alarms

  Missing Node (page 154) - You can configure an alarm to notify you if a node has not connected to the receiver within a specified length of time.

  Heartbeat (page 155) - You can configure HOBOnode Manager to periodically notify you that the receiver is active and communicating with nodes.

  Low Battery - You can set up an alarm to trip when battery gets low in a node or router.

Alarm Notification

You can set up Alarm Actions to be notified of alarm conditions by email, text message, or by an audio or visual alarm in HOBOnode Manager. Before you can set up alarms with Email or Text notifications, you must set your Alarm Preferences (page 151).

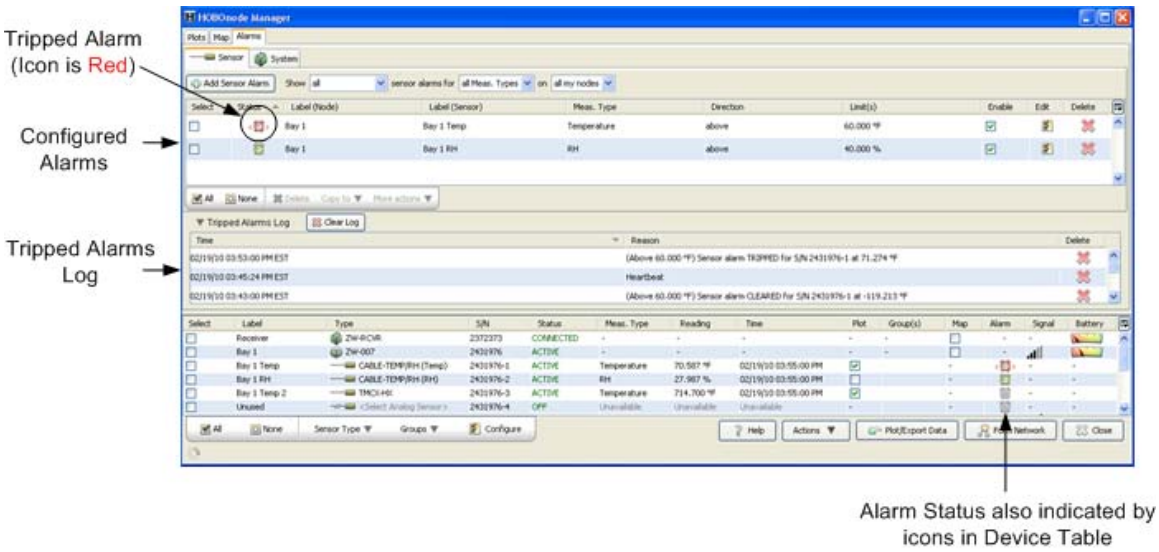
Sensor data is sent to the receiver periodically (based on the Connection Interval) and not continuously. Therefore, there is a delay between the time the alarm condition occurs and is recorded by the sensor and when you are alerted by any notifications you have configured. The default Connection Interval is 10 minutes. For critical applications, you may want to decrease the Connection Interval so that you are alerted to alarm conditions more frequently.

See Changing the Logging Interval and Connection Interval (page 194).

Monitoring Alarms

Once you have configured alarms, go to the Alarms window and click the Sensor pane to view tripped alarms.

Use Alarm Actions to receive visual, audible, or email/text notification when an alarm trips. See Adding a Sensor Alarm (page 152).



NOTE: If an alarm you configured is not appearing in the Alarms window, make sure the filter is set to Show all.

Deployment Guide

Before You Begin

Before you begin the setup procedure, Onset suggests you do the following to help make your deployment easier.

- Perform a Site Survey (page 134) to determine your equipment needs and locations.
- Review Deployment Guidelines (page 135).
- Put the enclosed sticker on the front of your data nodes and write down a descriptive label to help you identify the data node. You will enter the label in the software as well.
- Complete the Deployment Information Table to help you keep track of your data nodes.
- Create a Custom Network Map Image

You can upload a custom image, such as a floor plan, to use in the Network Map. If you don't already have an image, you can create one using a drawing program. You should upload your image before you add data nodes to your network so that you can place them on the map as you go.

See Uploading a Custom Network Map (page 177) for information on creating and uploading a custom image.

Site Survey

One of the first objectives in setting up a wireless network is to analyze your site to determine your equipment requirements and physical setup. This involves answering specific questions related to your particular application. Doing this prior to physical setup will save time and ensure the most efficient, productive, and cost-effective system possible.

- What do you want to measure?

Make a list of specific parameters to be measured (i.e., temperature, humidity, voltage, current, pulses). If possible, determine desired measurement frequencies for each.

- Where will you make your measurements?

Determine the physical location for each of the measurements by making a facility map. Include the physical distances between measurement locations. Include obstructions between measurement locations that may interfere with radio communication, such as metal walls, water pipes/tanks, or appliances.

- Does the location provide accurate representation?

Ensure that the locations chosen provide the most accurate representation for measurements. If, for example, you want to measure temperature for an air flow study, the most appropriate location for the measurement would be in close proximity to the airflow. You wouldn't want to make the measurement in a location where airflow doesn't exist or where dead spots occur, such as in the corners of a building.

- Do you need a concealed, inconspicuous location?

Onset has made every effort to design the network devices to be small, inconspicuous and tamperproof. If further security or concealment is required, the devices can be located in inconspicuous or hard-to-reach locations.

- How often will measurements be made?

Determine frequency requirements for each measurement. Some may need to be made more often than others.

- Is power available at measurement location?

Determine power availability (120VAC) for each of the measurements. This is important if you want a node to have routing capabilities as only a node with external power can act as a router.

Determining Equipment Requirements

With your site survey complete, you can make a list of equipment you need. As a general rule it's best to start at the measurement sites (data nodes) and work back to the receiver. Most data nodes offer multiple channels, giving flexible measuring capabilities while using minimal equipment.

Using the facility map, place nodes in each of the measurement locations and note if it will be plugged into an outlet (which gives it routing capabilities) or if it will have to run on battery power alone (not recommended).

Deployment Guidelines

Follow these guidelines when deploying nodes.

- **Maximum communication distance**

This system has been designed to communicate over distances up to approximately 150 -300 feet. This is assuming there are no obstructions or interference and a direct line-of-sight between the communicating devices. Obstructions to radio communications can be overcome by strategically placing a router to relay traffic around the obstruction.

The following table gives some general guidelines on the degree to which certain materials will obstruct your signal.

Materials	Degree of Attenuation *	Examples
Air	None	Open space, inner courtyard
Wood	Low	Door, floor, partition
Plastic	Low	Partition
Glass	Low	Un-tinted windows
Tinted glass	Medium	Tinted windows
Water	Medium	Aquarium, fountain
Living creatures	Medium	Crowds, animals, people, plants
Bricks	Medium	Walls
Plaster	Medium	Partitions
Ceramic	High	Tiles
Paper	High	Rolls of paper
Concrete	High	Load-bearing walls, floors, pillars
Bulletproof glass	High	Bulletproof windows
Metal	Very high	Reinforced concrete, mirrors, metal cabinet, elevator cage

* Attenuation is the gradual loss of signal intensity when passing through a medium.

- **Network Self Healing and Restoration**

The self-healing, restorative nature of a mesh network allows it to recover if a node becomes inoperable. If data nodes are routing data through a lost node, they will automatically search for a new node to act as a router to the receiver.

Ensure that if any one of the data nodes in your network become inoperable, there is another data node within range to take over routing for that node. Rearrange the data nodes or add new ones if required.

- **Deploying Temperature Sensors**

Follow these guidelines when deploying Temperature sensors:

Mount the sensor so that at least 10 cm (4 inches) of the sensor cable is placed in the medium that is being measured. The temperature sensor is approximately 0.32 cm (1/8 inch) from the end of the stainless steel tip.

When mounting the probe, care should be taken to thermally isolate the sensor from the mounting surface to ensure accurate air temperature readings.

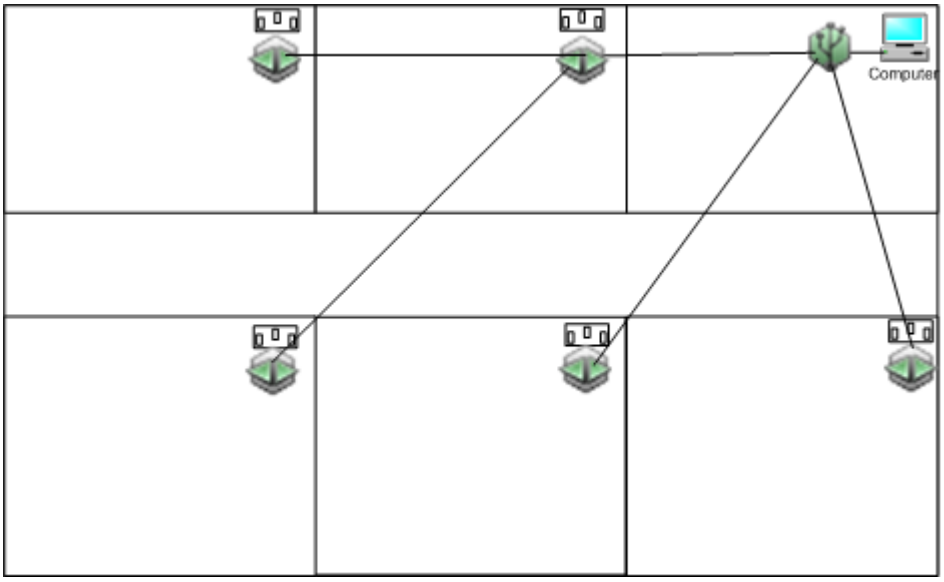
Device Types

The following table shows the different device types and how they appear in HOBOnode Manager.

Device Type/Icon in HOBOnode Manager		Primary Power Source	Functionality
Receiver		AC Power Outlet	Receives data from nodes and sends to HOBOnode Manager
Router (ZW-ROUTER)		AC Power Outlet	Routes data from nodes to the receiver or another node or router. Although the ZW-ROUTER has a temperature sensor, you should not rely on this sensor for accurate readings. Use this node for routing only.
Router/Node		AC Power Outlet	Records measurements from sensors and sends data to receiver. **Can** route data from other nodes. **IMPORTANT** Plug into AC power before installing batteries.
Node		3 AAA Batteries	Records measurements from sensors and sends data to receiver. **Cannot** route data from other nodes.

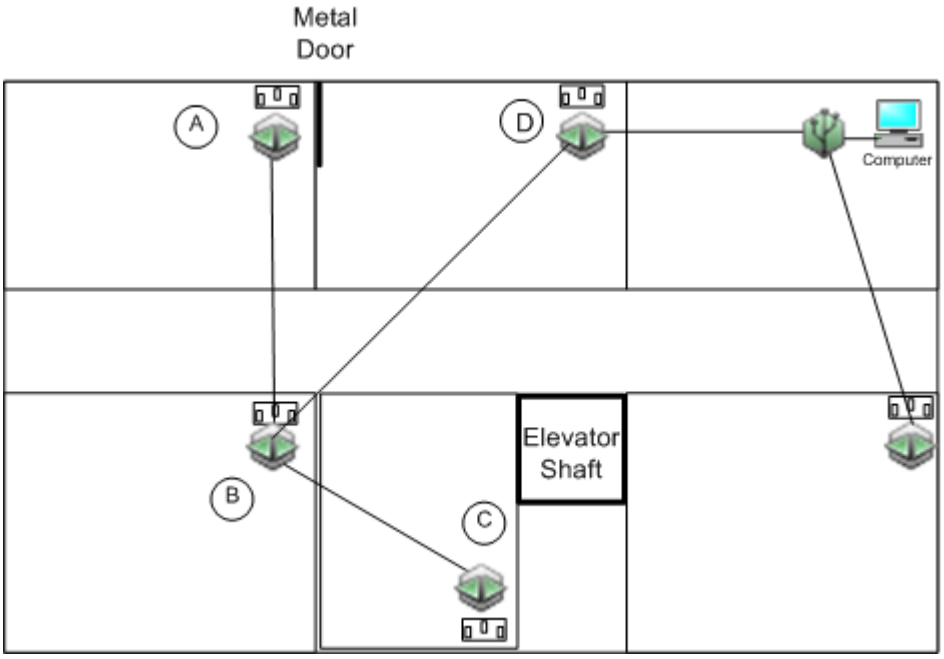
Basic Deployment

The diagram below shows an example of a basic setup where all data nodes are plugged into an AC power outlet (recommended) and there are no obstructions. Data from some nodes may pass through other data nodes to reach the receiver.



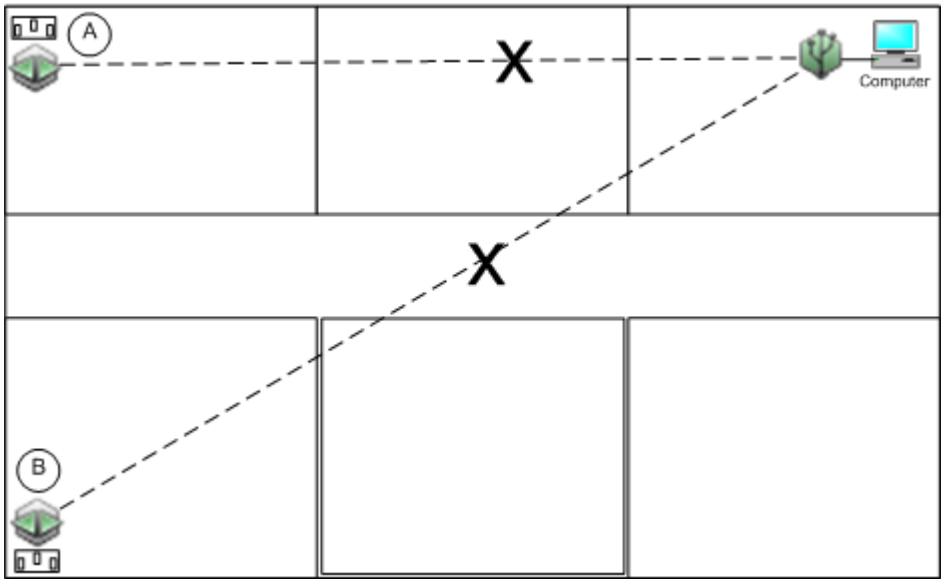
Overcoming Obstructions

The diagram below shows a scenario where there are some obstructions between some nodes and the receiver. Data node A is placed in a position so that it can connect to the receiver (through data node D), and also route data from data nodes B and C, which are obstructed from connecting directly to the receiver.

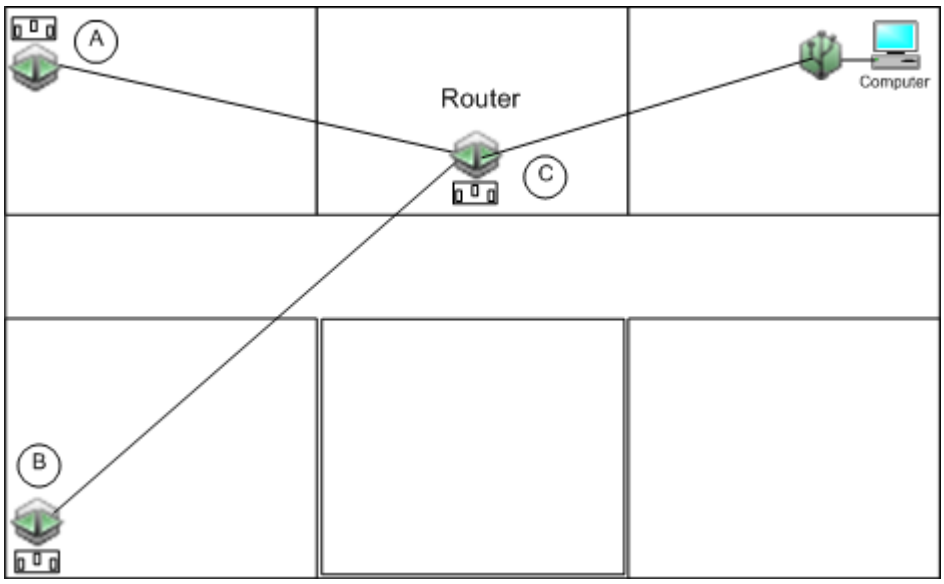


Overcoming Distance Limitations

The following diagram shows a scenario where data nodes A and B cannot connect to the receiver due to distance.



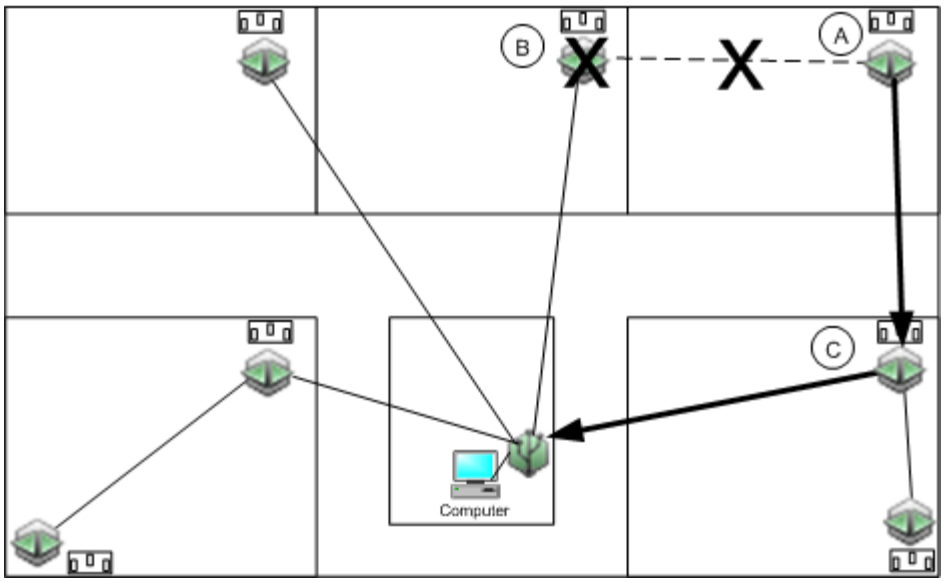
The following diagram shows a ZW-ROUTER (C) added to route data from data nodes A and B to the receiver. When you add a ROUTER, position it to maximize the number of nodes it can connect to. Add additional ROUTER(s) if needed.



Automatic Re-routing

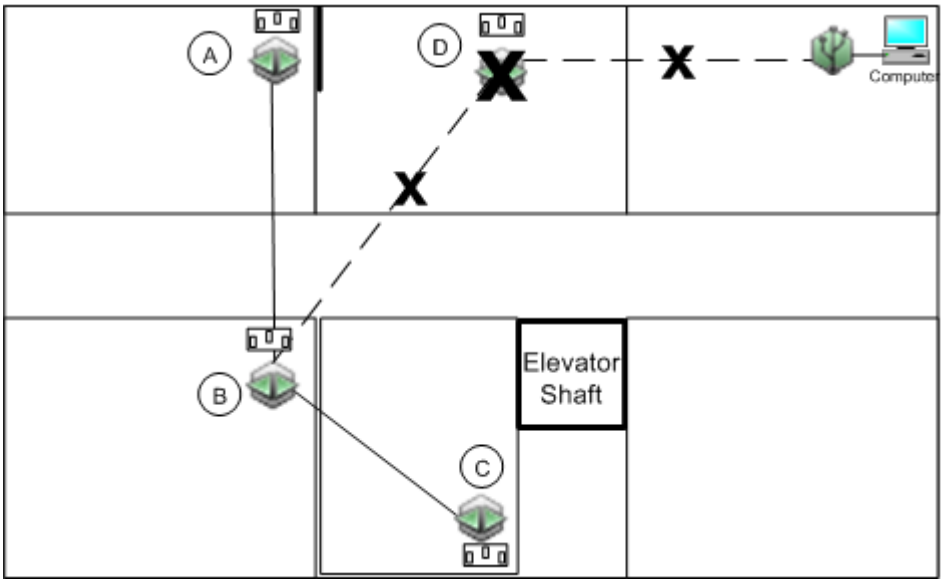
If a node loses its signal, a node routing though it will automatically search for a new route to receiver.

In the example below, data node A was routing data through data node B. When data node B loses communication with the receiver, data node A automatically searches for a new path and routes data through data node C.



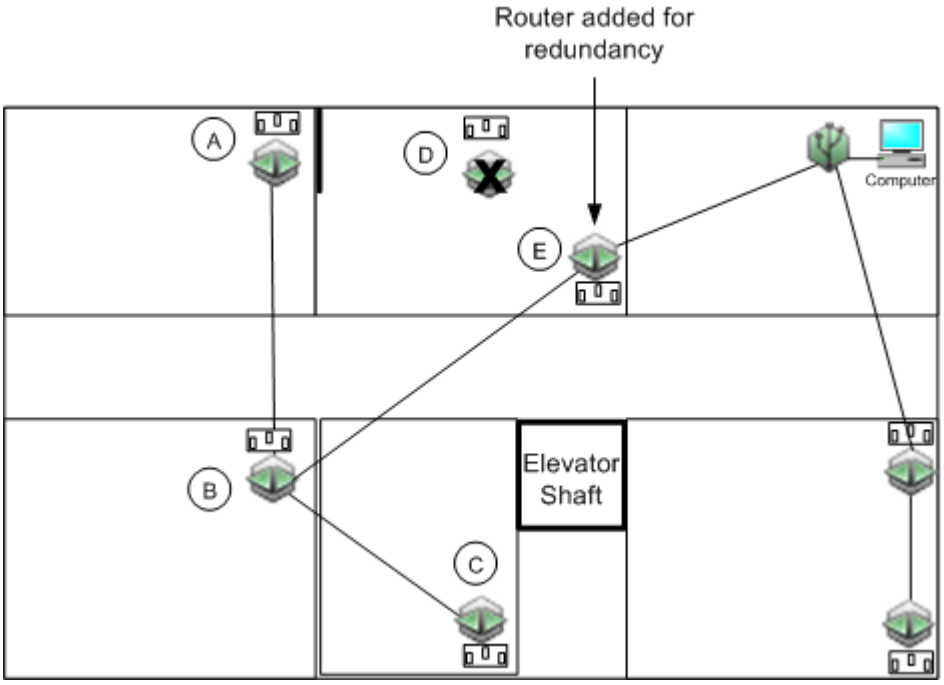
Backing up a Critical Node

In the diagram below, node D is in a critical path between 3 other nodes and the receiver. If node D goes down, nodes A, B, and C will have no connection to the receiver.



The following diagram shows how you can add a router or router/node to a critical spot in the network to overcome the loss of a data node. If data node D goes down, data node E will continue to route data from data nodes A, B, and C.

Although you want to mount the backup router/node in the same general area as the primary node so that you can connect to all of the remote nodes, you don't want to put it in the exact same spot as the primary node in case the cause of the lost connection is a signal obstruction that would affect both nodes.



Deployment Information Table

Before you begin configuring and deploying your nodes, record the serial number and location of all of your devices. Assign a unique label to each device to help you distinguish them from each other in HOBOnode Manager. When you configure each device you will enter this label.

Device Type	Label	Serial Number	Location

Basic Network Setup

Summary of Tasks

This procedure is intended to help you get a receiver and one data node up and running so you can get familiar with the hardware and software. Once you are familiar with the basic setup tasks, you can go back and add additional nodes and perform advanced configuration if required.

IMPORTANT: Do not install batteries until instructed to do so.

Task 1: Install HOBOware and Start HOBOnode Manager (page 141)

Task 2: Supply Power to Receiver (page 141)

Task 3: Supply Power to Data Node (page 141)

Task 4: Connect the Receiver to your Computer (page 142)

Task 5: Add Node to the Network (page 142)

Task 6: Select External Sensor Type (Optional) (page 144)

Task 7: Verify Proper Operation (page 145)

Task 8: Add More Data Nodes to the Network (page 146)

Task 9: Configure Advanced Features (page 146)

Task 1: Install HOBOware and Run HOBOnode Manager

If you have not already done so, install HOBOware.

A. Insert the HOBOware Installation CD into your computer's CD drive.
B. Follow the prompts to install HOBOware. See Installing HOBOware on page 13 for details.

HOBOware should open automatically when installation is complete.

C. From the HOBOware main menu, select Devices > Manage HOBO Data Node Network.
D. A message may appear asking if you wish to add permanent support for HOBO data nodes. Click **Yes** to continue.

Task 2: Supply Power to the Receiver

Use the supplied power adapter to connect the receiver to a wall outlet.

A. Insert the connector into the **Pwr** jack on the receiver.
B. Insert the power plug into a wall outlet.
C. Insert 3 AAA batteries into the receiver for backup power. See Installing Batteries.
A. Place the receiver into the stand provided.

Task 3: Supply Power to Data Nodes

Onset strongly recommends that you deploy data nodes where they can be plugged into a wall outlet, which allows them to route data from other data nodes. This optimizes your network reliability.

What to look for: To verify that you have powered the node correctly, watch the LEDs when you connect power. Both the RED and GREEN LEDs flash for 5 seconds, then the RED LED blinks for 5 seconds, then both LEDs blink once, and then both LEDs go OFF. This confirms that the data node is powered using a wall outlet and can route data.

Use the supplied power cord to connect the data node to a wall outlet.

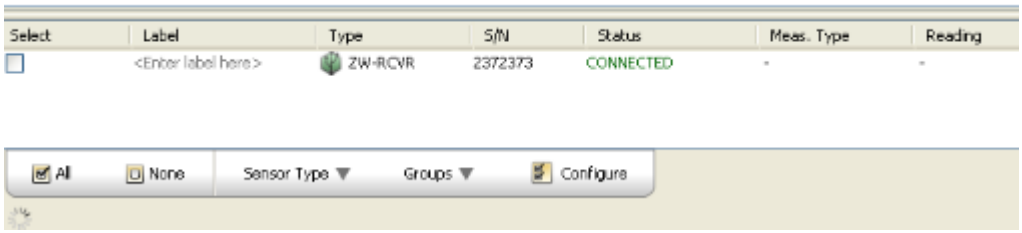
A. Insert the power cord connector into the **Pwr** jack on the data node.
B. Insert the power plug into a wall outlet.
C. Insert 3 AAA batteries for backup power. See Installing Batteries.

Task 4: Connect the Receiver to your Computer

IMPORTANT: Make sure you do not plug the receiver into a USB port that may be shut down due to your computer's power settings. Onset recommends that you do not enable Power Saving options such as Turn off Hard Disks, Hibernation, or Shut Down on your computer. If you connect the receiver to a USB port on your monitor, do not enable the Energy Saver option on your monitor.

A. Connect the small end of the USB cable to the **comm** port on the receiver.
B. Plug the large end of the USB cable into a USB port on your computer.

The receiver will appear in the Device Table at the bottom of the HOBOnode Manager window.



Troubleshooting: If the receiver does not appear in the Device Table, make sure that the cable is completely plugged in at both ends. Try unplugging the receiver and plugging it back in.

A message appears indicating that a receiver has been detected and asking if you'd like to form a network now.

C. Click the **Form network now** button to put the receiver in Form Network mode, allowing you to add nodes to the network. You can also click **Not yet**, and click the **Form Network** button when you are ready to proceed

LED Indication: When the receiver is in Form Network mode, the RED and GREEN LEDs will alternate blinking slowly.

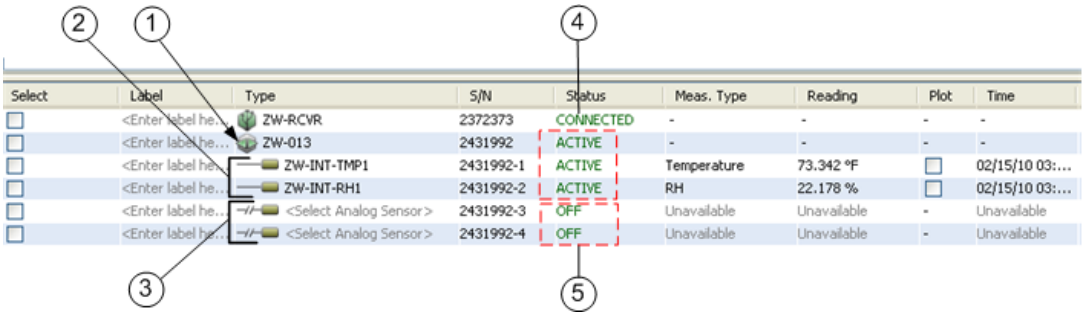
Task 5: Add Data Node to the Network

Before you Begin: Make sure the receiver is in Form Network mode (RED and GREEN LEDs flashing continuously and Forming Network progress indicator appears on screen). If not, click the Form Network button at the bottom of the HOBOnode Manager window.

A. If there are any external sensors that will be used with this node, connect them now.
B. To activate a data node and add it to the network, use a wire paper clip to **briefly** press the button located inside the small hole at the bottom of the case.

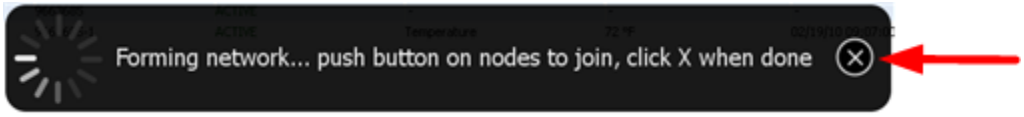
LED Indication: While the data node is searching for a receiver, the RED and GREEN LEDs will alternate blinking.

The data node will appear in the Device Table at the bottom of the HOBOnode Manager window.



C. Exit Form Network Mode

Once the node appears in the Device Table at the bottom of the HOBOnode Manager window, you can exit Form Network mode. Click the X on the Form Network Progress Indicator to exit Form Network mode.

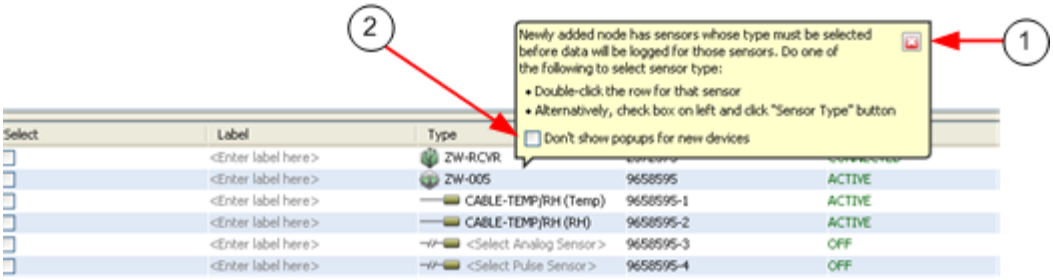


D. View Data Node Popup Balloon

When you first add a data node to the network, a popup balloon appears providing some configuration information about the node.

1. To dismiss the popup balloon, click the red X in the top right corner.

2. To disable future popups, check the *Don't show popups for new devices* box.



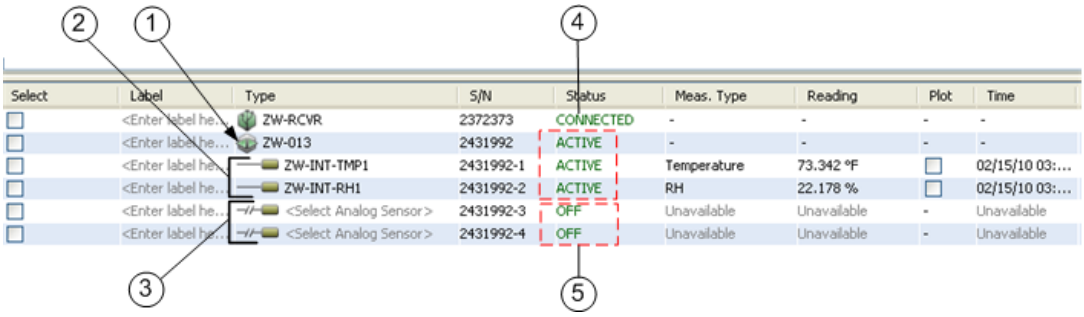
Note: If you have a ZW-005 or a ZW-007 and only have an External Temp/RH sensor installed, you do not need to select a sensor type.

E. View Device Table

The node (1) will appear in the Device Table at the bottom of the HOBOnode Manager window, with additional rows for each internal sensor (2) and external sensor or sensor port (3).

The Status column for nodes and internal sensors (4) will indicate ACTIVE.

The Status column for configurable external sensors (5) will indicate OFF, and the Type column will be grayed out, until you select a Sensor Type in Task 6. This does not apply to the external Temp/RH sensor, which is automatically recognized by HOBOnode Manager.

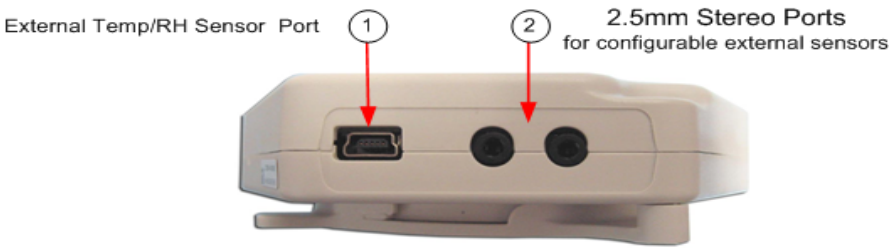


Task 6: Select External Sensor Type

IMPORTANT: Refer to the documentation that came with your sensor for connection information.

You must assign a sensor type for any external sensors you have connected to the node (except for the External Temp/RH sensor).

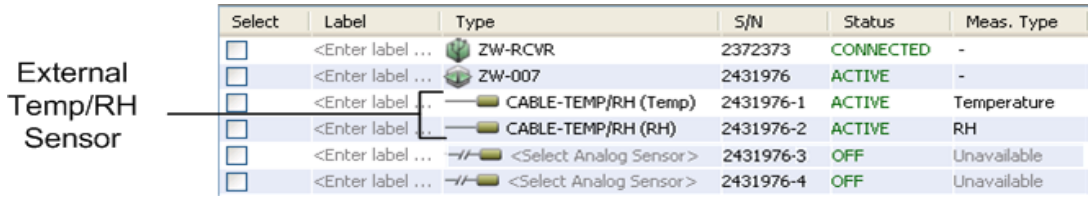
External Sensor Ports



External Temp/RH sensor

The ZW-005 and the ZW-007 support the External Temp/RH sensor (Part #: CABLE-TEMP/RH), which plugs into the External Temp/RH Sensor Port (#1 in the photo above). This sensor is preconfigured and you do not have to select a sensor type.

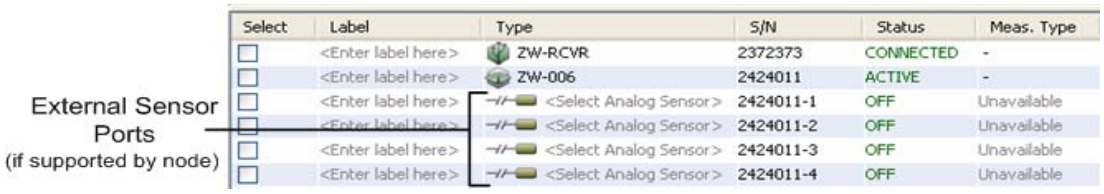
Separate rows appear under the node for the Temperature and RH channels with corresponding entries in the Type column.



Configurable External Sensors

Some data nodes support up to four configurable external sensors, which plug into one of the 2.5mm Stereo Ports (#2 in the photo above). You must select a Sensor Type in HOBOnode Manager for these sensors.

When the data node appears in the Device Table, configurable external sensors will not have an entry in the Type column.



Steps

Follow these steps to select a Sensor Type for configurable external sensors.

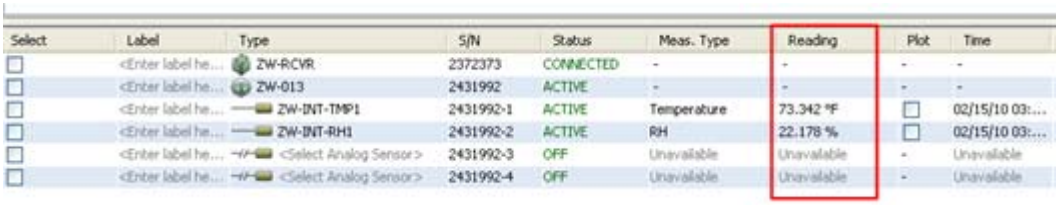
A. Double-click the row for the sensor in the Device Table.
B. Select the Sensor Type from the drop-down list.
C. Add a label for the sensor (optional).
D. Click **OK**.

Once you select a sensor type, the Status will change to ACTIVE and the appropriate measurement type will appear in the Measurement Type column.

Task 7: Verify Proper Operation

View Readings

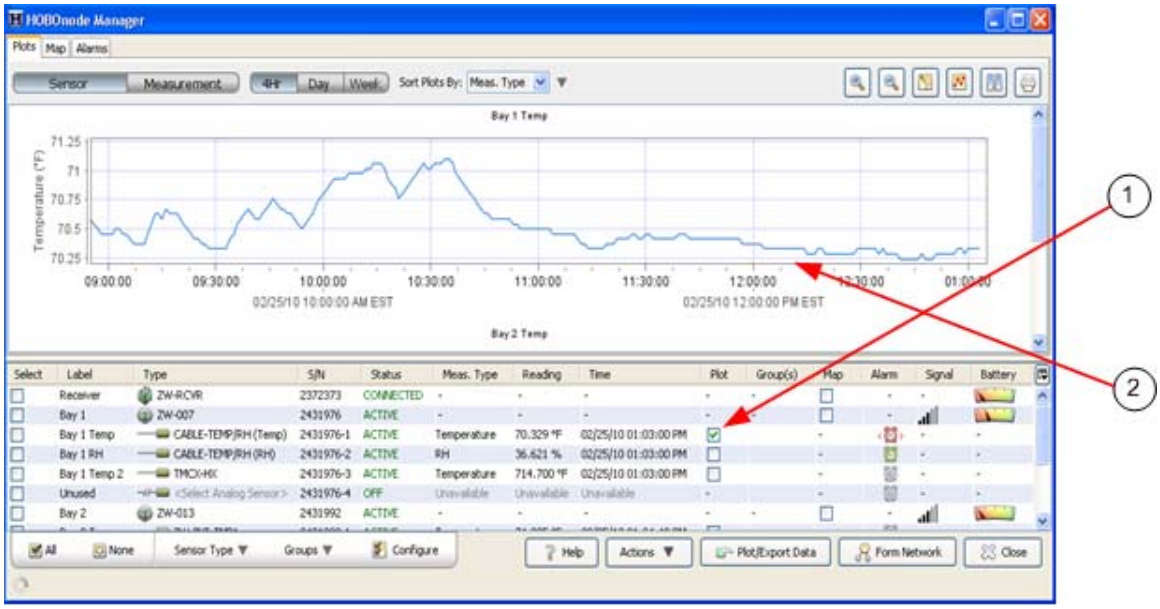
You should see values in the Reading column for internal sensors within a few minutes after the node is added to the network. External sensor readings may take up to 10 minutes after you select a Sensor Type.



Troubleshooting: If you do not see readings for an external sensor, make sure it is securely plugged into the data node and that you have selected a sensor type.

View Real-Time Data

1. Check the box in the Plot column for the sensor in the Device Table.
2. Verify that the plot appears. It may take up to 10 minutes after you add the data node to the network for data to begin appearing in the plot.



Task 8: Add More Data Nodes to the Network

Now that you are familiar with the procedure for adding a data node to the network, you can add the rest of your data nodes.

A. Supply Power to Data Nodes (Task 3).

   IMPORTANT: Make sure you are familiar with the power options, and the implications of using one or the other. See Powering Data Nodes.

B. Click the **Form Network** button at the bottom of the HOBOnode Manager window.
C. When all data nodes are added to the network and they appear in the Device Table, exit Form Network mode by clicking the X on the Form Network progress indicator.

Task 9: Configure Advanced Features (Optional)

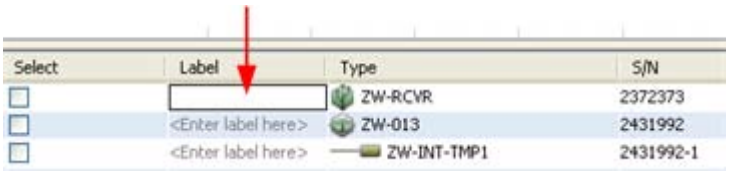
This section outlines a variety of features to help you set up and monitor your network, and to plot data to view in HOBOware or another application. You can configure these features now or at a later time.

For details on a specific feature, click the Help button located on the window related to the feature (if applicable), or open the entire Help by clicking the Help button at the bottom of the HOBOnode Manager window.

Add Labels

You can enter a descriptive label for each node and sensor to help you identify them in the Device Table when configuring alarms and when plotting/exporting data.

To label a device, double-click the Label column where it says <Enter label here> and type in the label.



Configure Alarms

There are two categories of alarms in HOBOnode Manager:

- Sensor Alarms

A sensor alarm trips when a sensor goes out of a range that you configure. You can set up to be notified by email, text message, or by an audio or visual alarm in HOBOnode Manager.

- System Alarms

Missing Node (page 154) - The Missing Node alarm notifies you if a data node has not connected to the receiver within a specified period of time.

Heartbeat (page 155) - The Heartbeat alarm periodically notifies you that the receiver is active and communicating with data nodes.

Low Battery - This alarm trips when the batteries are low in nodes or routers.

To configure a Sensor Alarm in HOBOnode Manager, click the button in the Alarm column in the Device Table. This opens the Add Sensor Alarm window. Enter alarm values as desired. To quickly get familiar with alarms, select either a Visual or Audible notification Action. Before you can set up alarms with Email or Text notifications, you must set your Alarm Preferences.

For More Information: See Adding a Sensor Alarm.

To enable a System Alarm (Missing Node, Heartbeat, or Low Battery), click the Alarms tab at the top of the HOBOnode Manager window, click the System tab, and then click the Enable button for the desired alarm. To quickly get familiar with alarms, select either a Visual or Audible notification Action. Before you can set up alarms with Email or Text notifications, you must set your Alarm Preferences.

For More Information: See Enabling a Heartbeat Alarm and Enabling a Missing Node Alarm.

Email or Text Message Notifications

Before you can set up alarms with Email or Text Message notifications, you must set your Alarm Preferences. At the bottom of the HOBOnode Manager window click the **Actions** button and then select Edit HOBO Data Node Preferences.

For More Information: See Setting Alarm Preferences.

Set up Network Map

Place icons on the Network Map to help you keep track of your devices. You can expand Information Balloons on the device to view status information and sensor readings. You can import a custom background image, such as a floor plan.

See Adding a Device to the Network Map (page 174) for details.

Modify Logging and Connection Intervals

By default, data nodes record data from sensors once per minute (logging interval), and connect to the receiver every 10 minutes (connection interval). To change the logging interval and connection interval for a data node, double-click the row for the data node in the Device Table and change the values in the Configure Node window.

The minimum logging interval is 1 minute. The minimum connection interval is 2 minutes and must be at least twice the logging interval. Changes to the logging interval and connection interval will take effect the next time the data node connects to receiver.

See Changing Logging and Connection Intervals for additional details.

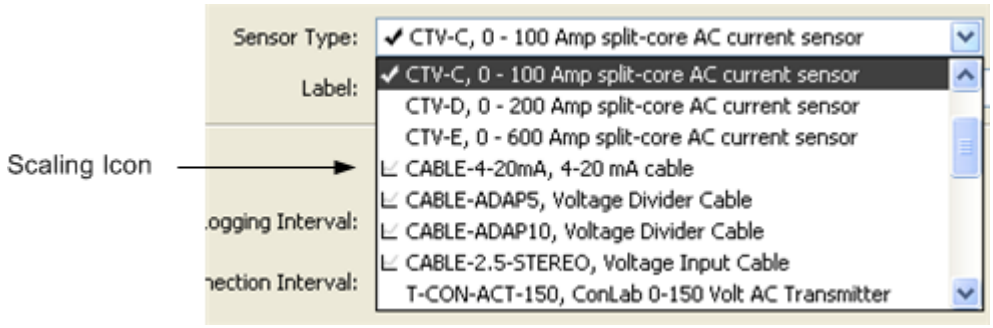
NOTE: Alarm notifications are sent to HOBOnode Manager when the node connects to the receiver. When configuring your Connection Interval, consider that less frequent connections will result in more delay in receiving alarm notifications.

Configure External Sensor Type/Scaling (Optional)

Assign a Sensor Type to external sensors. Double-click the sensor row and select the sensor type from the Sensor Type drop-down list.

To configure scaling for third-party sensors, click the **Configure** button in the Scaling section and enter values in the Configure Scaling window. Click the **View Scaling Factors** button on the Configure Scaling window for details.

A scaling icon appears in the Sensor Type drop-down list next to sensors that support scaling.


Sensor Type:
Label:
Scaling Icon
ogging Interval:
nection Interval:
✔ CTV-C, 0 - 100 Amp split-core AC current sensor
✔ CTV-C, 0 - 100 Amp split-core AC current sensor
CTV-D, 0 - 200 Amp split-core AC current sensor
CTV-E, 0 - 600 Amp split-core AC current sensor
CABLE-4-20mA, 4-20 mA cable
CABLE-ADAP5, Voltage Divider Cable
CABLE-ADAP10, Voltage Divider Cable
CABLE-2.5-STEREO, Voltage Input Cable
T-CON-ACT-150, ConLab 0-150 Volt AC Transmitter

See Configuring Scaling on a Sensor (page 160) for more information.

Plot/Export Data

To plot data for viewing in HOBOware Pro, or to export data to a text file for use with a third-party application, click the Plot/Export Data button at the bottom of the HOBOnode Manager window to open the Plot/Export Wireless Data window.

For More Information: See Plotting or Exporting Data window.

Use Groups to Sort Sensors

You can assign sensors to groups in the Device Table and then use the groups to sort rows in the table, to refine a list of sensors in the Plot/Export Wireless Data window, or to copy sensor alarms.

See Using Groups to Sort Sensors (page 182) for more information.

Modify HOBOnode Manager Preferences

Use the HOBOnode Manager Preferences to change the default behavior of HOBOnode Manager. To go to the HOBO Data Nodes Preferences window, click **Actions** at the bottom of the HOBOnode Manager window and select *Edit HOBO Data Node Preferences*. For details see HOBOnode Manager General Preferences (page 200).

Powering Data Nodes

Onset strongly recommends that you deploy data nodes where they can be plugged into an AC power source. This allows them to route data from other nodes, providing your network maximum routing capabilities, which improves the reliability and redundancy of your system. Using AC power also greatly reduces the frequency with which batteries will have to be replaced.

IMPORTANT: How a data node is **initially** powered determines if it will be able to route data from other nodes. If you plug the data node into a wall outlet first, it will be able to route data. If you install batteries before you plug the data node into the wall, it will not be able to route data.

Data Nodes Plugged into Wall Outlet

IMPORTANT: If a data node will have access to a wall outlet when deployed, do not insert batteries until you have plugged the HOBO data node into a wall outlet. If you install batteries before you plug it into the wall, it will not have routing capabilities.

If a data node will be plugged into a wall outlet when deployed:

1. Insert the power cord connector into the Pwr jack on the receiver.
2. Insert the power plug into an AC wall outlet.

   LED Indication: Both the RED and GREEN LEDs flash for 5 seconds, then the RED LED blinks for 5 seconds, then both LEDs blink once, and then both LEDs go OFF. This confirms that the data node is powered using a wall outlet and can route data.

3. After you have plugged the data node into the wall outlet, insert 3 AAA batteries for backup power.

If you are configuring data nodes at your desk, you can plug them into a wall outlet one at a time, add them to the network, and then unplug them until you move them to their deployment location.

Once you have added a data node to the network and performed setup, you can unplug it and use the AC Power outlets for other nodes. Data nodes will run on battery power until you are ready to deploy them.

IMPORTANT: If you initially configure a data node with AC Power connected, but at some point it no longer has access to AC power, you must remove the node from the network and then re-join with only batteries installed. See Switching from AC Power to Battery Power (page 194).

Nodes without Access to AC Power

IMPORTANT: If a data node will not have access to a wall outlet when deployed, do not plug it into a wall outlet before installing batteries.

IMPORTANT: Data nodes that are not initially connected to a wall outlet will not have routing capabilities.

1. Insert 3 AAA batteries.

   LED Indications: Both GREEN and RED LEDs will flash for 5 seconds, then the RED LED will flash for 5 seconds, and then both LEDs will be OFF.

IMPORTANT: If you initially configure a node with only batteries as a power source, but at a later point it has access to AC power, you must remove the node from the network and then re-join it. See Switching from Battery Power to AC Power (page 194).

Verify Power Source in HOBOnode Manager

When you add a data node to the network and it appears in the Device Table in HOBOnode Manager, verify that the icon in the Type column indicates the correct node type: router/node, or node.

	Router/Node	Node can route data from other nodes. **IMPORTANT**: If a node appears as a router/node but is not plugged into a wall outlet when deployed, the batteries will be drained very quickly. See *Switching from AC Power to Battery Power* in the HOBOware Help for information.
	Node	Node cannot route data from other nodes. **IMPORTANT**: If this node is actually plugged into wall outlet and intended to be a router/node, you may have installed batteries before plugging it into the wall. See *Switching from Battery Power to AC Power* in the HOBOware Help for information.

Deploying Data Nodes

Once you have activated all nodes and they appear in the Device Table, you can deploy them to their locations. Make sure you have completed the Deployment Information Table (page 140) to help you identify them later.

The range of a node is approximately 150 ft. to 300 ft., depending on the number of and type of obstructions. Use trial and error to place nodes where you need them, and move closer to the receiver if you cannot establish a connection. Use other nodes or routers to establish a connection.

NOTE: For a node to act as a router, it must be powered through an electrical outlet.

See the Deployment Guide section for more information.

For wall mounting, remove the back cover from the node and mount it to the wall using a screw or nail through the mounting holes, then attach the node to the cover.

Viewing Wireless Data on your Local Area Network

You can view plots and data from your HOBO data node network on your local area network with HOBOnode Viewer. While HOBOnode Manager requires a direct connection on a dedicated PC to monitor your network, HOBOnode Viewer gives you the flexibility to see data node plots and network status anywhere. This allows you to:

- Look at real-time data from your local area network with any browser
- Check on the data node network remotely to make sure it is running properly and that no devices are missing or alarms have tripped
- Share data with others by sending them a link to HOBOnode Viewer

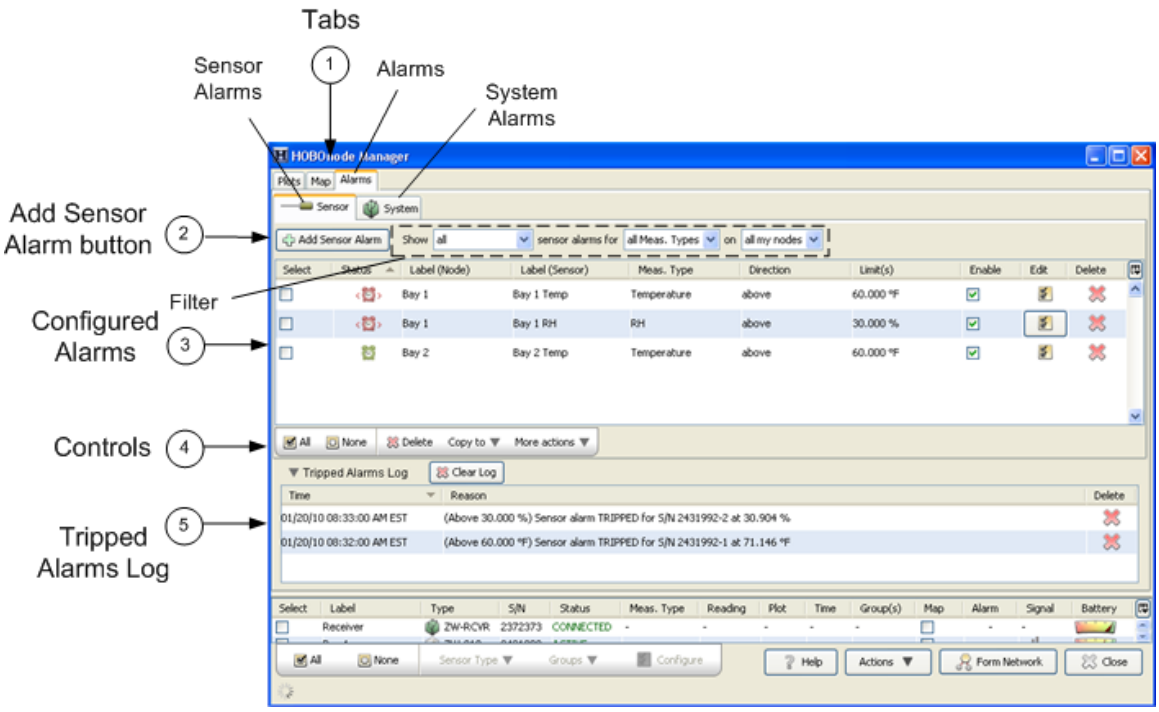
HOBOnode Viewer is a locally hosted website easily configured within HOBOware preferences. Once HOBOnode Viewer is enabled, HOBOware will create a link for your own web page that displays the real-time plots and data for your data node network. The HOBOnode Viewer web page will always be available as long as HOBOnode Manager remains open on the computer with your HOBOnode database.

Alarms

The Alarms Window

In the **Alarms** window you can:

- Define sensor alarm conditions
- Enable/disable system alarm conditions (missing node, heartbeat, and low battery)
- Define alarm actions (including email, text message, visual notification, and audible alarm)
- Copy sensor alarms to other sensors
- View tripped alarms



1. Tabs

Alarms tab: Click the Alarms tab to go to the Alarms window

Sensor tab: Click the Sensor tab to go to the Sensor Alarms pane.

System tab: Click the System tab to go to the System Alarms pane.

2. Add Sensor Alarm button: Click to go to the Add Sensor Alarms window.
3. Configured Alarms: Configured sensor alarms appear here.

Use the Filter to control what alarms shown in the sensor alarms pane.

NOTE: If an alarm you configured is not appearing in the Alarms window, make sure the filter is set to Show *all*.

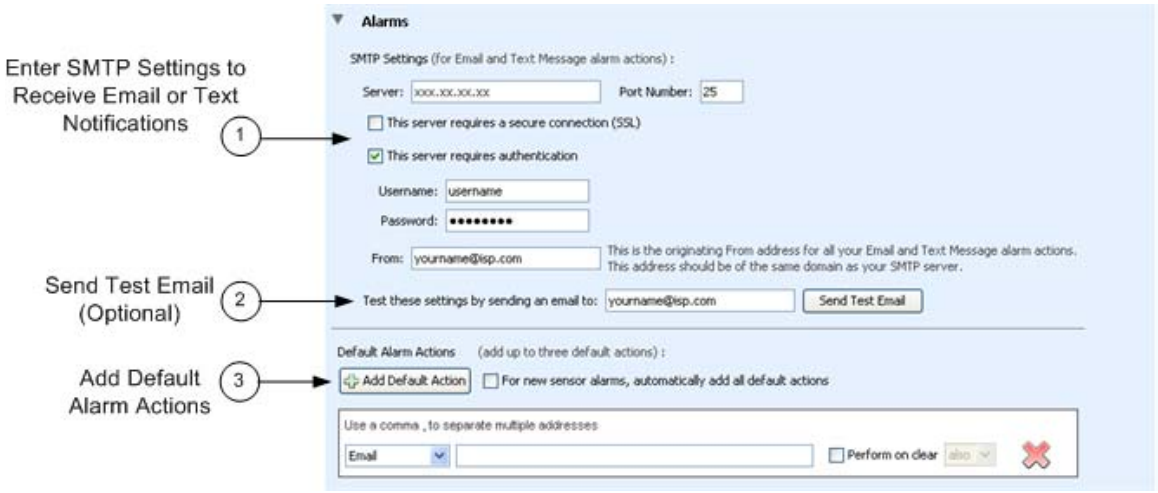
4. Controls - Use the controls to apply an action to multiple alarms, including: delete, copy, enable/disable, and apply default actions.
5. Tripped Alarms Log - all tripped alarms appear here. Click the **Clear Log** button to delete all tripped alarms.

NOTE: When an alarm trips, HOBOnode Manager is opened, if it is not already.

Setting Alarm Preferences

Before you add sensor alarms, set up your Alarm Preferences for email notifications and create default actions (notifications).

To open the Preferences window, click **Actions** at the bottom of the HOBOnode Manager window and select *Edit Data Node Preferences*.


Enter SMTP Settings to Receive Email or Text Notifications
1
Send Test Email (Optional)
2
Add Default Alarm Actions
3
Alarms
SMTP Settings (for Email and Text Message alarm actions) :
Server: xxx.xx.xx.xx
Port Number: 25
This server requires a secure connection (SSL)
This server requires authentication
Username: username
Password:
From: yourname@isp.com
This is the originating From address for all your Email and Text Message alarm actions. This address should be of the same domain as your SMTP server.
Test these settings by sending an email to: yourname@isp.com
Send Test Email
Default Alarm Actions (add up to three default actions) :
Add Default Action
For new sensor alarms, automatically add all default actions
Use a comma , to separate multiple addresses
Email
Perform on clear
also

1. Enter SMTP Settings for Email or Text Notifications

To receive email or text message alarm notifications, enter the Server IP Address for your mail server, and enable SSL or authentication if required by your network. See your Network Administrator or your Internet Service Provider for information; see also Email Configuration for more information.

2. Send Test Email

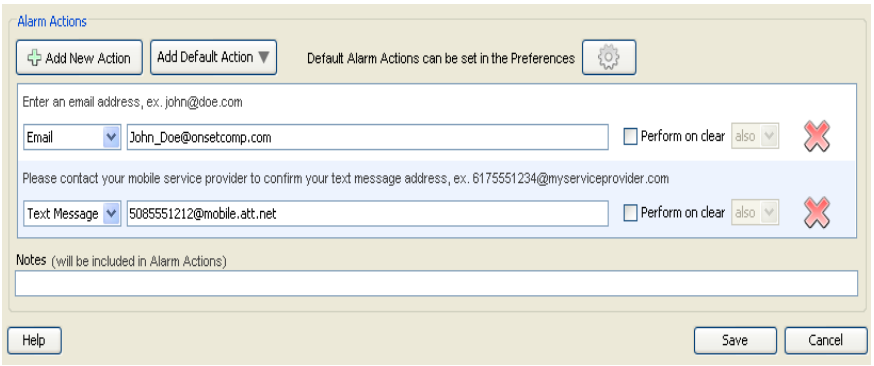
Enter your email address and click the Send Test Email button to verify that your settings are correct. Make sure you check your Junk Mail or Spam folder for the email if it is not in your inbox.

3. Add Default Alarm Actions (Optional)

Entering default alarm actions simplifies alarm configuration. For example, instead of entering the same email address for every alarm, you can select an address from a list of drop-down entries when you add the alarm action.

For more details on alarm actions, see Adding Alarm Actions.

If you check *For new sensor alarms, automatically add all default actions*, when you click the **Add Sensor Alarm** button, the alarm actions you configured are automatically added, as shown below. This is helpful if you want the same actions for every alarm.



Adding a Sensor Alarm

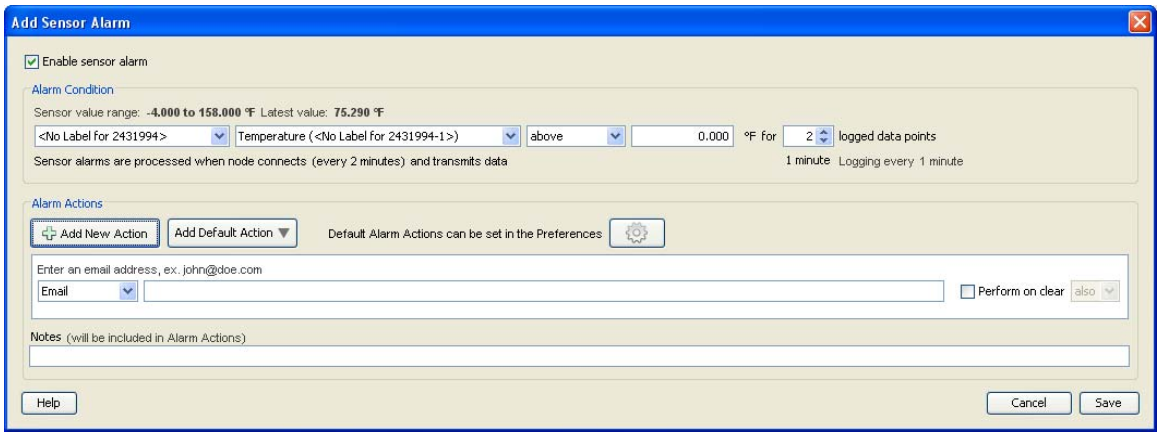
A sensor alarm trips when a sensor goes out of a threshold that you configure. You can set up actions to be notified by email, text message, or by an audio or visual alarm in HOBOnode Manager. Once you create an alarm you can copy it to multiple sensors of the same measurement type or the same measurement type and group.

NOTE: Alarm notifications are sent to HOBOnode Manager when the node connects to the receiver. The default Connection Interval is 10 minutes. If you change it, consider that less frequent connections will result in more delay in receiving alarm notifications.

Opening the Add Sensor Alarm window

The first time you add an alarm for a sensor, you can double-click on the alarm icon for the sensor in the Device Table. This will open the Add Sensor Alarm window with the sensor already selected.

Otherwise, click the Alarms tab, then the Sensor tab, and then the **Add Sensor Alarm** button. With this method you will then need to select the sensor from a drop-down list.



1. Make sure the Enable sensor alarm checkbox is selected.
2. Select the sensor (if not already selected). If you accessed the Add Sensor Alarm window by clicking on the alarm icon in the Device Table, the sensor will automatically be populated. Otherwise, select the sensor you want to add the alarm to.
3. Configure Alarm Parameters.

    a. Select the threshold: Above, Below, or Outside Range.

    a. Enter the value for the alarm.

    b. Enter the Number of Data points. This is the number of readings that must be outside of the limits for the alarm to be tripped or cleared.

4. Configure Alarm Actions (Notifications).

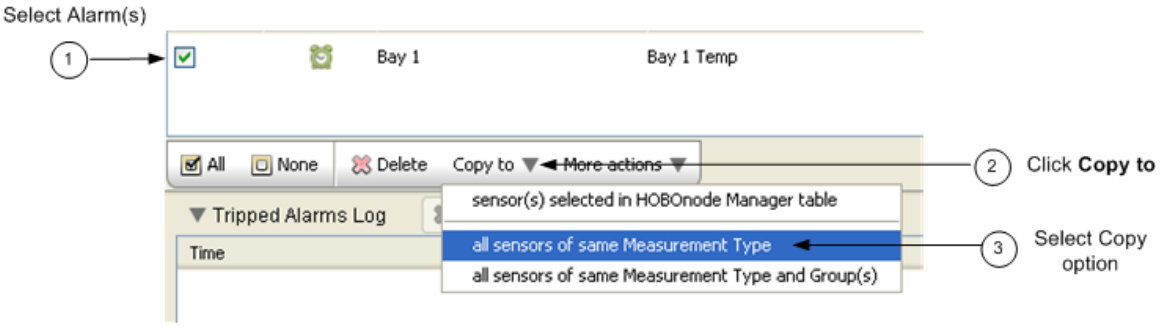
    See Adding Alarm Actions.

5. Click **Save**.

NOTE: Any time you edit an existing alarm, the alarm state is reset to untripped and the logged data points is reset to zero.

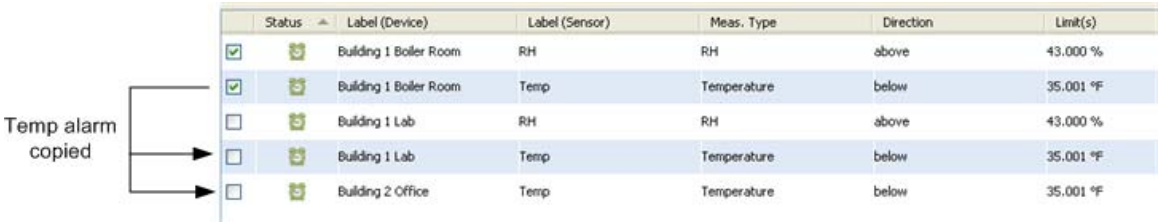
Copying a Sensor Alarm to Other Sensors

To copy an alarm to other sensors:



1. Select Alarm(s) - Select the alarms you want to copy. You can select alarms for multiple measurement types and each alarm will only be copied for sensors of that type.
2. Click the **Copy to** button.
3. Select Copy Option - You can copy the alarm to all sensors of the same Measurement Type, or to Measurement Type and Group(s).

The alarms are copied to the sensors, as shown below.



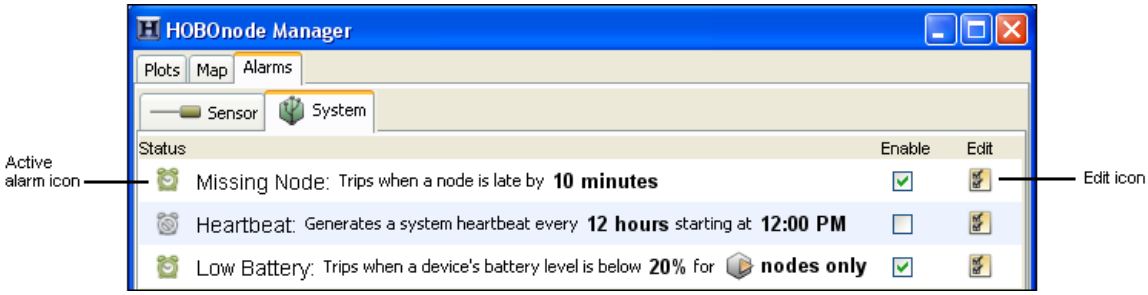
Enabling a Missing Node Alarm

A Missing Node alarm trips when a data node has not connected to the receiver within the specified timeframe.

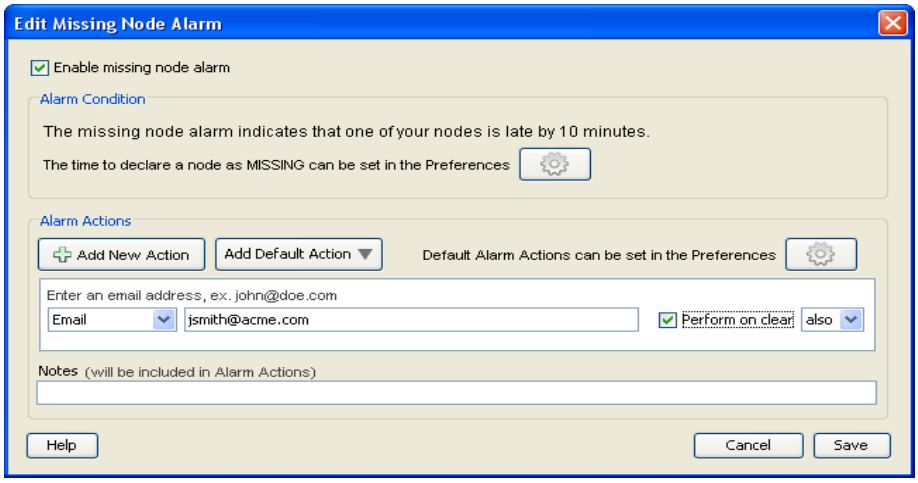
The default period to determine that a node is missing is 10 minutes. You can change this in the Preferences.

To enable a missing node alarm:

1. Click the Alarms tab in HOBOnode Manager.
2. Click the System tab and select the checkbox in the Enable column for Missing Node. If alarm actions have already been configured by a previous edit, then the Status icon for Missing Node will change to an active alarm icon as shown below. This means the alarm is enabled. If an Edit Missing Node Alarm dialog box appears or you wish to make additional changes to this alarm, then proceed to next step.



3. An Edit Missing Node Alarm dialog box may open automatically. If it does not and you wish to change the settings, then click the Edit icon for Missing Node as shown above.


Edit Missing Node Alarm
Enable missing node alarm
Alarm Condition
The missing node alarm indicates that one of your nodes is late by 10 minutes.
The time to declare a node as MISSING can be set in the Preferences
Alarm Actions
Add New Action
Add Default Action
Default Alarm Actions can be set in the Preferences
Enter an email address, ex. john@doe.com
Email
jsmith@acme.com
Perform on clear
also
Notes (will be included in Alarm Actions)
Help
Cancel
Save

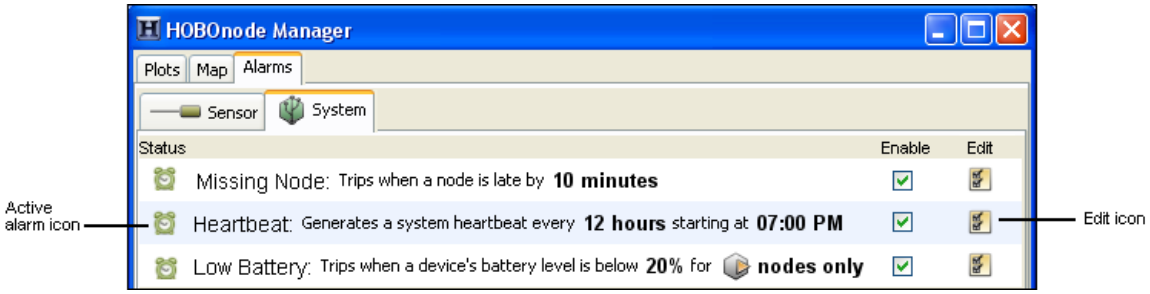
4. Make sure the **Enable missing node alarm** checkbox is selected.
5. By default, the alarm will trip after the node is missing for 10 minutes. Click the Preferences button if you wish to change the default time period.
6. Add one or more alarm actions, which is how you will be notified when the alarm trips. You can be notified via email or text, or by a visual cue or audible sound on the computer where HOBOnode Manager is running.
7. Click **Save**. The changes you made to the missing node alarm are displayed on the System tab.

Enabling a Heartbeat Alarm

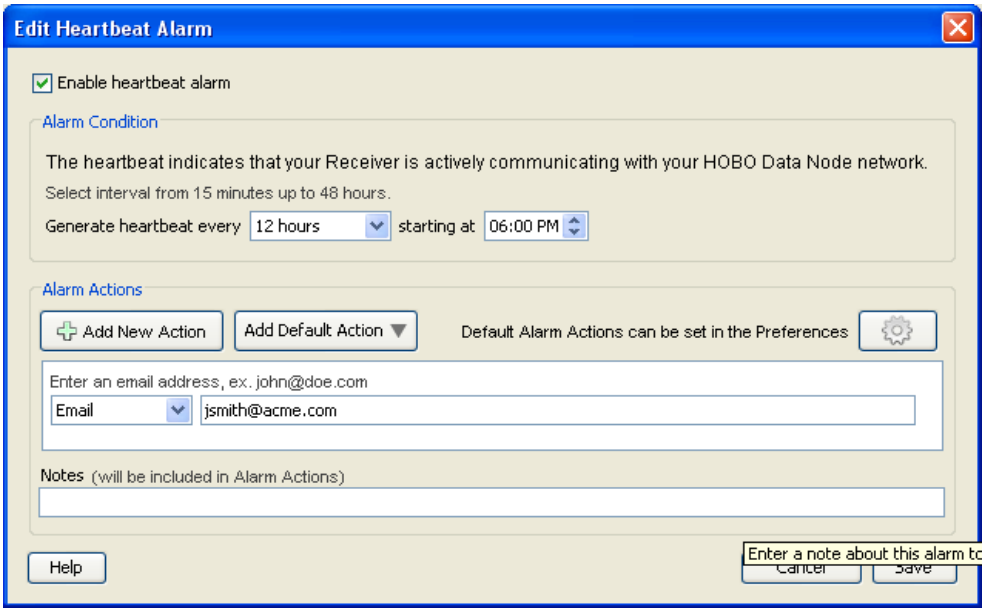
If you enable a Heartbeat alarm, a heartbeat is generated every 12 hours (configurable) to let you know that the system is up and running. If you do not receive a heartbeat notification, check the status of your receiver and restart HOBOware if necessary.

To configure a heartbeat alarm:

1. Click the Alarms tab in HOBOnode Manager.
2. Click the System tab and select the checkbox in the Enable column for Heartbeat. If alarm actions have already been configured by a previous edit, then the Status icon for Heartbeat will change to an active alarm icon as shown below. This means the alarm is enabled. If an Edit Heartbeat dialog box appears or you wish to make additional changes to this alarm, then proceed to next step.



3. An Edit Heartbeat dialog box may open automatically. If it does not and you wish to change the settings, then click the Edit icon for Heartbeat as shown above.


Edit Heartbeat Alarm
Enable heartbeat alarm
Alarm Condition
The heartbeat indicates that your Receiver is actively communicating with your HOBO Data Node network.
Select interval from 15 minutes up to 48 hours.
Generate heartbeat every 12 hours starting at 06:00 PM
Alarm Actions
Add New Action
Add Default Action
Default Alarm Actions can be set in the Preferences
Enter an email address, ex. john@doe.com
Email
jsmith@acme.com
Notes (will be included in Alarm Actions)
Help
Enter a note about this alarm tc
Cancel
Save

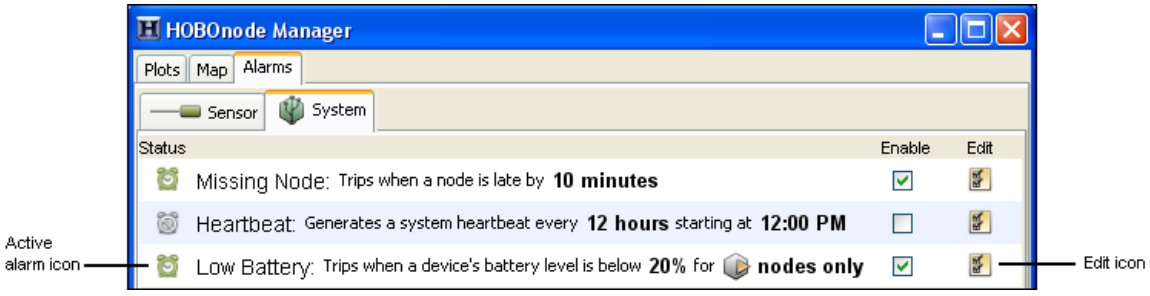
4. Make sure the **Enable heartbeat alarm** checkbox is enabled.
5. Select how often you want to generate a heartbeat and what time you want to start.
6. Add one or more alarm actions, which is how you will be notified when the alarm trips. You can be notified via email or text, or by a visual cue or audible sound on the computer where HOBOnode Manager is running.
7. Click **Save**. The changes you made to the heartbeat alarm are displayed on the System tab.

Enabling a Low Battery Alarm

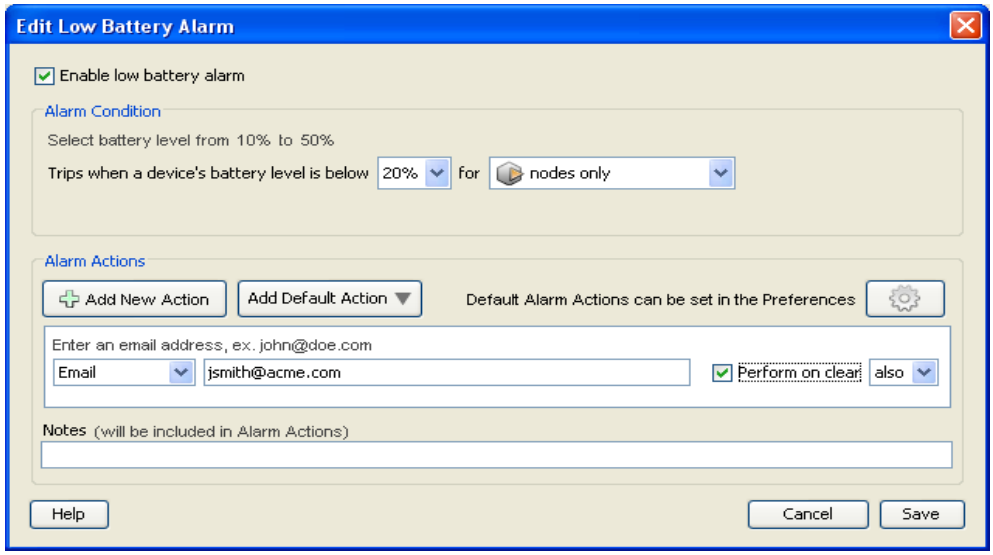
You can set an alarm to trip when the battery level in a data node or a router drops below a specific threshold. This can help you determine when it is time to change the batteries for devices in your network. The low battery alarm is a system-wide alarm, which means it applies to all devices (either all nodes or all nodes and routers) in the network. You cannot set a low battery alarm for some data nodes and not others.

To configure a low battery alarm:

1. Click the Alarms tab in HOBOnode Manager.
2. Click the System tab and select the checkbox in the Enable column for Low Battery. If alarm actions have already been configured by a previous edit, then the Status icon for Low Battery will change to an active alarm icon as shown below. This means the alarm is enabled. If an Edit Low Battery dialog box appears or you wish to make additional changes to this alarm, then proceed to next step.



3. An Edit Low Battery dialog box may open automatically. If it does not and you wish to change the settings, then click the Edit icon for Low Battery as shown above.



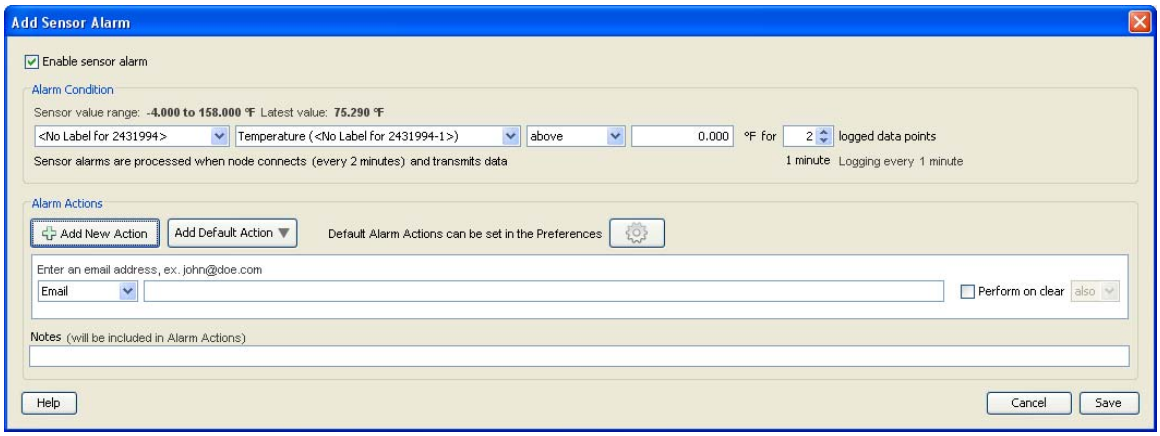
4. Make sure the **Enable low battery alarm** checkbox is enabled.
5. Select the battery level at which you want the alarm to trip, from 10 to 50%. For example, if you choose 20%, then the alarm will trip once the device's remaining battery power drops below 20%.
6. Select whether the battery alarm should trip for nodes only or for both nodes and routers. **Notes:** You cannot set a low battery alarm for a receiver because it should always be powered by an AC adapter. In addition,you should not set a low battery alarm for routers that do not have batteries installed. If your routers are powered by AC adapters only and do not have backup batteries installed, then you should set the battery alarm for nodes only.
7. Add one or more alarm actions, which is how you will be notified when the alarm trips. You can be notified via email or text, or by a visual cue or audible sound on the computer where HOBOnode Manager is running.
8. Click **Save**. The changes you made to the low battery alarm are displayed on the System tab. **Note:** If the low battery alarm was previously configured and had tripped, then clicking Save will clear the tripped state. If the newly saved settings result in an alarm condition, then the alarm will trip at the next connection interval.

Adding Alarm Actions (Notifications)

An alarm action is a notification when an alarm trips or and/or clears. You can configure the alarm action to notify you in four ways:

- Via email
- Via text message
- With a visible message on your computer
- With a sound on your computer

Before you set up email or text notifications, you must configure your SMTP settings. See Setting Alarm Preferences.



1. Click the **Add New Action** button.

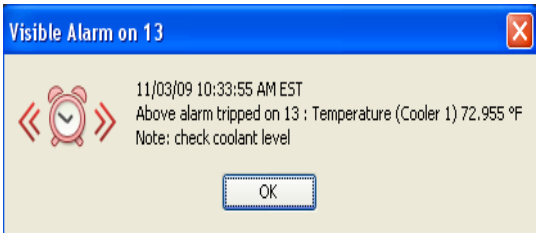
Tip: To save time, you can configure default alarm actions. See Setting Alarm Preferences for information.

A new action is added.

2. Select the type of notification: Email, Text Message, Visible, or Audible.
3. Enter information or make a selection depending on the type of notification.

NOTE: If you add an email or text notification and you have not already setup your SMTP settings, you will be prompted to do so.

- Email - Enter the email address where you want the alarm notification sent.
- Text Message - enter the email address where you want the alarm notification sent.
- Visible - no further configuration required. A pop-up window will appear in HOBOnode Manager if the alarm trips.


Visible Alarm on 13
11/03/09 10:33:55 AM EST
Above alarm tripped on 13 : Temperature (Cooler 1) 72.955 °F
Note: check coolant level
OK

- Audible - Select the sound that you want to play when an alarm trips. Click the Play icon to hear the alarm.

  NOTE: If multiple audible alarms are set, only the most recent will play. Any other actions configured for the alarm will be sent.

4. Check the **Perform on clear** box if you want a notification when the alarm clears. If you only want a notification when the alarm clears and not when it is tripped, change the drop-down selection to *only*.
5. Add Notes to be included in the alarm notification (optional).

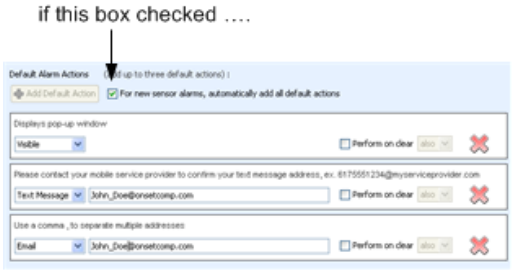
To add another action, repeat the procedure.

Using Default Alarm Actions

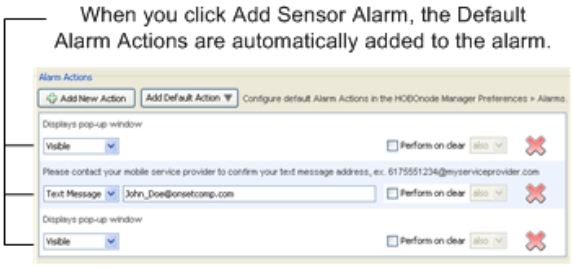
You can configure Default Alarm Actions in the HOBO Data Node Preferences. See Adding Alarm Actions (Notifications) (page 157).

You can have the default actions automatically added to any sensor alarms you add, or you can manually select individual default actions for each alarm.

Automatically Add Default Actions to Alarms



HOBOware Preferences > HOBOnode > Alarms



Add Sensor Alarm Window

Manually add Default Actions to Alarms

HOBOware Preferences > HOBOnode > Alarms

When you click Add Default Action Alarm, the Default Alarm Actions appear in the drop-down list. Select an entry to add the action in to the alarm.
Alarm Actions
Add New Action
Add Default Action
Configure default Alarm Ac
Notes (will be included in
Visible
Text Message John_Doe@onsetcomp.com
Email John_Doe@onsetcomp.com

Add Sensor Alarm Window

Email Configuration

SMTP Settings

You must configure the SMTP Settings to allow email from the data node network to get to your email recipients.

Corporate Environment

If your data node network is within a corporate network environment, you should contact your Network Administrator (IT/MIS dept.) for this information. Also, they may need to add the receiver to a White List to allow it to relay email through the corporate email server.

Private Email

If you use a private mail account such as Yahoo or Google, or if you do not know your corporate information, you can get the outgoing mail parameters from your mail provider.

The following are links to this information for some providers. For other providers, search on-line for "SMTP Settings for <provider name>".

- Gmail

  http://mail.google.com/support/bin/answer.py?hl=en&answer=13287

- Hotmail

http://liveunplugged.spaces.live.com/blog/cns!F92775FC46A390CA!422.entry

Sending an Alarm to a Cell Phone

To send an email to your cell phone when an alarm occurs, enter the email address for your cell phone.

Following are the formats for some cell phone providers. For others, contact your provider. You can usually obtain this information on-line.

Alltel

[10-digit phone number]@message.alltel.com

Example: 2125551212@message.alltel.com

AT&T (formerly Cingular)

[10-digit phone number]@txt.att.net

Example: 2125551212@txt.att.net

Boost Mobile

[10-digit phone number]@myboostmobile.com

Example: 2125551212@myboostmobile.com

Nextel (now part of Sprint Nextel)

[10-digit telephone number]@messaging.nextel.com

Example: 7035551234@messaging.nextel.com

Sprint PCS (now Sprint Nextel)

[10-digit phone number]@messaging.sprintpcs.com

Example: 2125551234@messaging.sprintpcs.com

T-Mobile

[10-digit phone number]@tmomail.net

Example: 4251234567@tmomail.net

Verizon

[10-digit phone number]@vtext.com

Example: 5552223333@vtext.com

Virgin Mobile USA

[10-digit phone number]@vmobl.com

Example: 5551234567@vmobl.com

External Sensors and Scaling

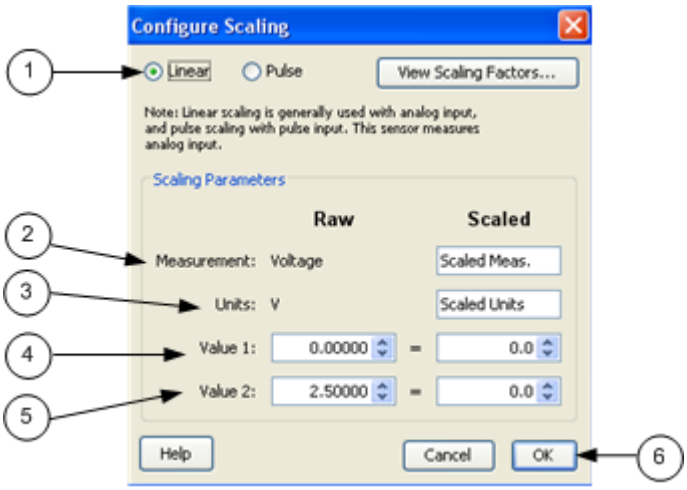
Configuring Scaling on a Sensor

To open the Configure Scaling window:

1. Double-click the sensor in the Device Table to open the Configure Sensor window

2. Select the Sensor Type if not already selected.
3. Click the **Configure** button.

Configure Scaling Window



1. Select Scaling Type (Linear or Pulse) - The Scaling Type is automatically selected based on the type of sensor selected. Linear scaling is enabled for analog sensors; Pulse scaling is enabled for pulse sensors.
2. Enter the Scaled Measurement type.

The Raw Measurement is the source measurement type (such as Current, Voltage, or Counts).

3. Enter the scaled units.

The Raw Units is the type of output the sensor has; either V or mA, corresponding to the type of sensor selected. Raw Value 1 and Raw Value 2 should be entered in these units.

4. Enter the Raw and Scaled for Value 1.

Raw - The low raw value given by the external sensor.

Scaled - The value that will appear on the graph when the sensor reports a raw value equal to Raw Value 1. This value should be entered in the same units that are specified in the Scaled Units box.

5. Enter the Raw and Scaled for Value 2

Raw - The high raw value given by the external sensor.

Scaled - The value that will appear on the graph when the sensor reports a raw value equal to Raw Value 2. This value should be entered in the same units that are specified in the Scaled Units box.

6. Click **OK** when done.

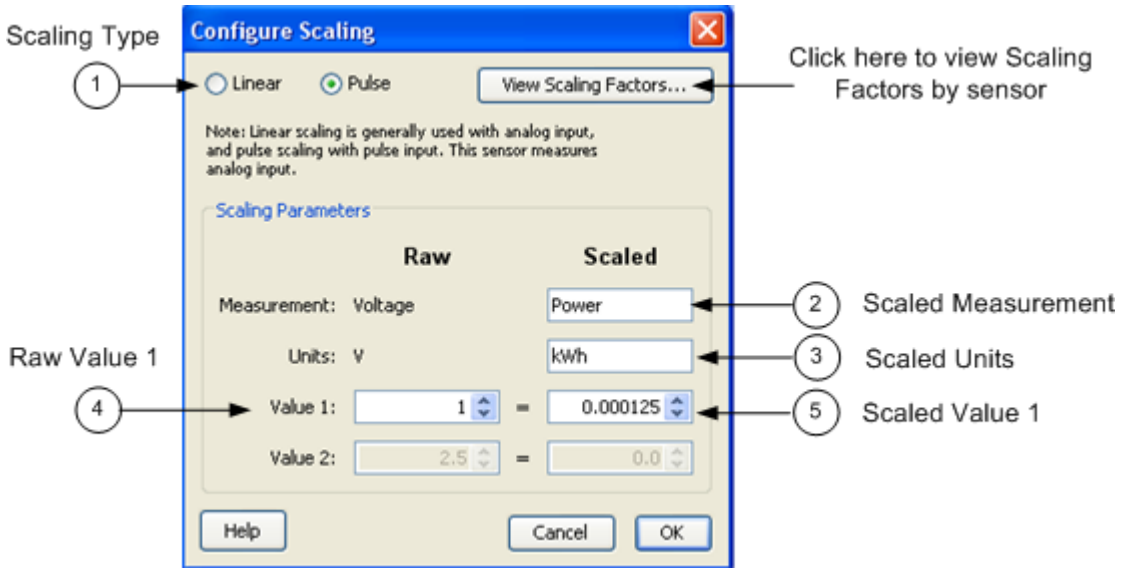
Once scaling is configured on a sensor, the scaled icon will appear in the Meas. Type column in the Device Table.

Wattnode Scaling Factors: T-WNB-3Y-208/T-WNB-3D-240/T-WNB-3D-480

Use the table below to find the Kilowatt-hours per pulse for your CT Size and WattNode model and enter it in the Scaled Value 1 box.

Example

This is example shows the values you would enter in the Configure Scaling window for a Wattnode 3Y-208 with a 5 amp CT.



1. Scaling Type = Pulse
2. Scaled Measurement = Power
3. Scaled Units = kWh
4. Raw Value 1 = 1
5. Scaled Value 1 = 0.000125

Kilowatt-hours per pulse

CT Size (amps)	Kilowatt-hours per pulse	
	Model #: 3Y-208 / 3D-240	Model #: 3D-480
5	0.000125	0.0002885
15	0.000375	0.0008656
20	0.0005	0.0011541
30	0.00075	0.0017313
50	0.00125	0.0028854
60	0.0015	0.0034625
70	0.00175	0.0040396
100	0.0025	0.0057708
150	0.00375	0.0086563
200	0.005	0.011542
250	0.00625	0.014427
300	0.0075	0.017313
400	0.01	0.023083

600	0.015	0.034625
800	0.02	0.046167
1000	0.025	0.057708
1200	0.03	0.06925
1500	0.0375	0.086563
2000	0.05	0.11542
3000	0.075	0.17313

Veris Scaling Factors: T-VER-8051-300/T-VER-8053-800

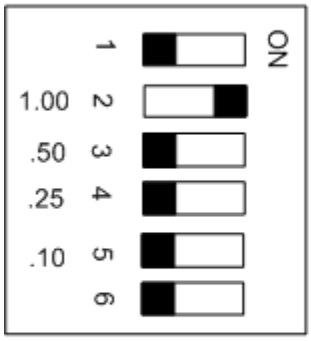
The consumed energy in kilowatt-hours (kWh) per pulse for these sensors is determined by the DIP switch setting on the transducer. The default is "1.00" kWh / pulse, at which the scaling factor is 1 = 1. If you change the default DIP switch settings, adjust your scaling factors accordingly, as shown below.

The data recorded by the data node will be the number of counts (pulses) per sampling interval.

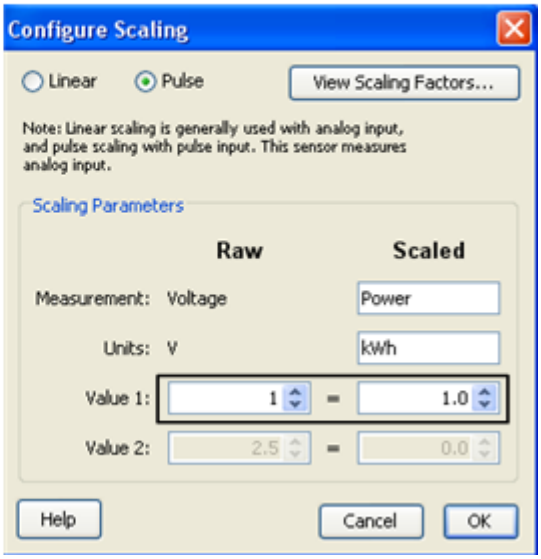
Cable Required/Sensor Type: CABLE- 2.5-STEREO

1 Pulse Per kWh (Default)

DIP Switch Setting on Transducer

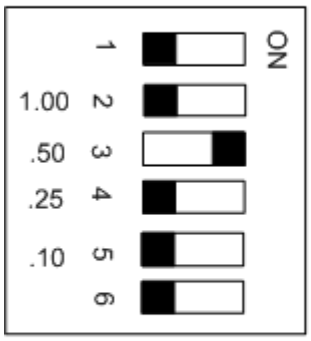


Values in Configure Scaling Window

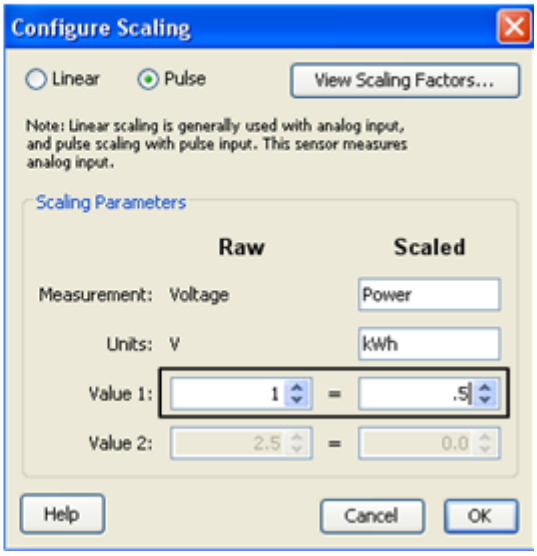


.5 Pulse Per kWh

DIP Switch Setting on Transducer

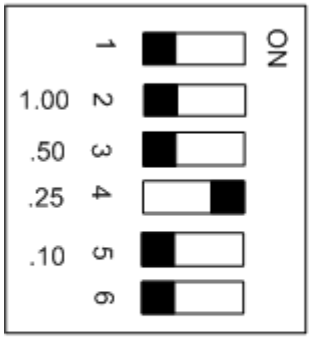


Values in Configure Scaling Window

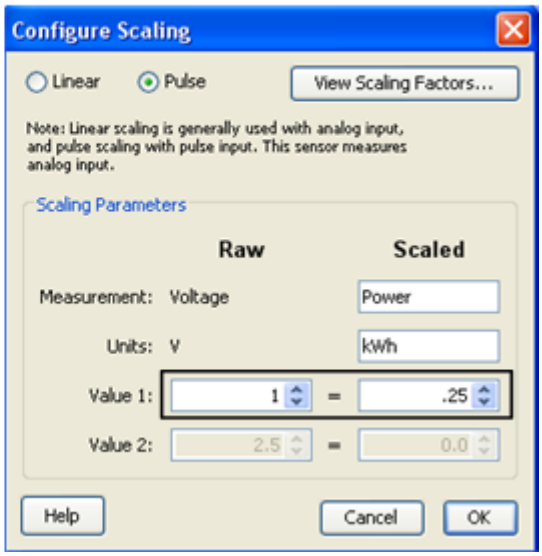


.25 Pulse Per kWh

DIP Switch Setting on Transducer

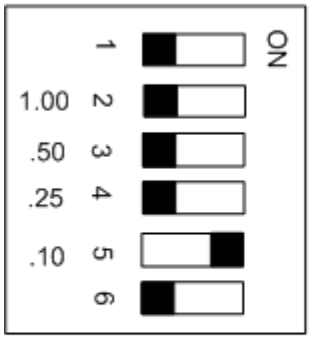


Values in Configure Scaling Window

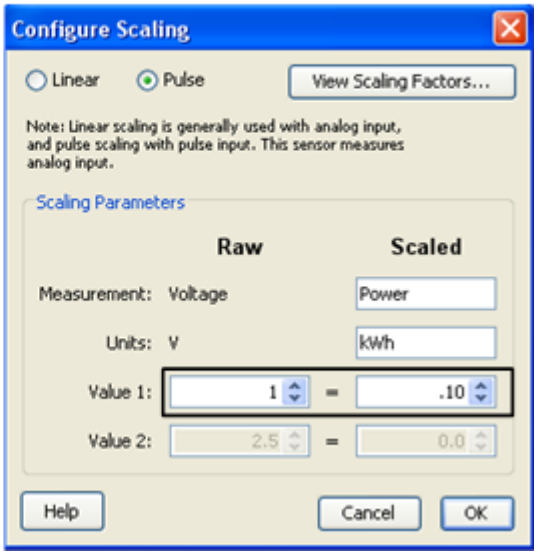


.10 Pulse per kWh

DIP Switch Setting on Transducer



Values in Configure Scaling Window



Veris Scaling Factors: T-VER-H970-200

The T-VER-H970-200 has a selectable range for Linear Scaling: mA or Volts -> Amps. An AC-DC power adapter with a minimum of 6W @ 35mA is required for excitation power.

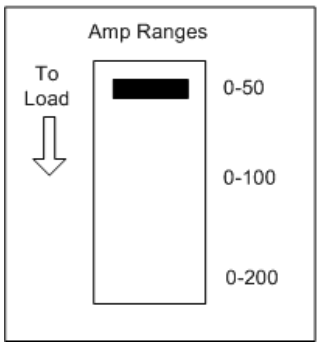
Cable Required/Sensor Type

Use the appropriate cable to connect the sensor to the data node and select the corresponding cable in the Sensor Type drop-down when configuring the External Sensor in HOBOnode Manager.

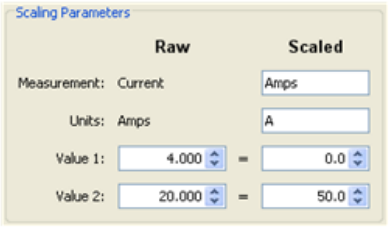
- For 4-20mA output, use CABLE-4-20mA.
- For 0-5vdc output, use CABLE-ADAP5.

0-50 Amps

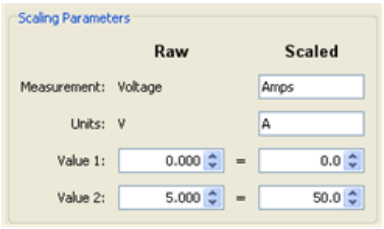
Switch Setting on T-VER-H970-200



Values in Configure Scaling Window



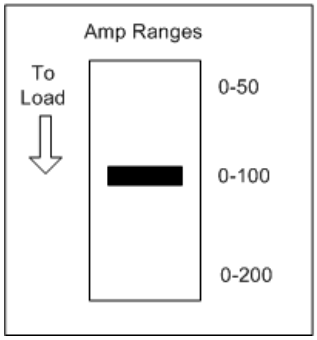
4-20mA



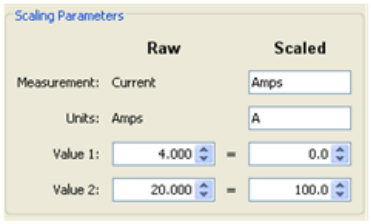
0-5vdc

0-100 Amps

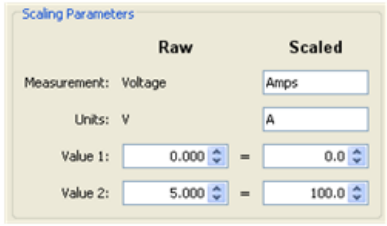
Switch Setting on T-VER-H970-200



Values in Configure Scaling Window



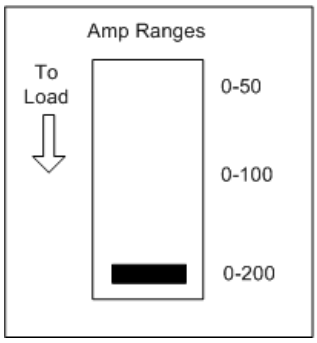
4-20mA



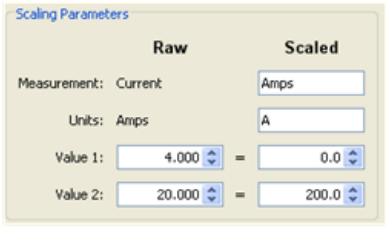
0-5vdc

0-200 Amps

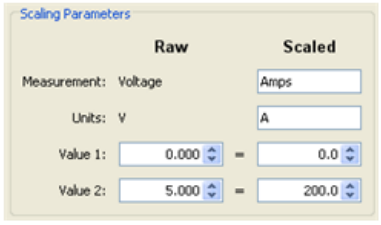
Switch Setting on T-VER-H970-200



Values in Configure Scaling Window



4-20mA



0-5vdc

Veris Scaling Factors: T-VER-971BP-200

The T-VER-971BP-200 has a selectable range for Linear Scaling: mA or Volts -> Amps for current flow in both directions.

Cable Type/Sensor Type

Use a CABLE-4-20mA to connect the sensor to the data node and select CABLE-4-20mA in the Sensor Type drop-down when configuring the External Sensor in HOBOnode Manager.

Notes:

- Requires 12-24VDC @ 35 to 110 mA excitation power depending on DC current load.
- An AC-DC power adapter with a minimum of 6W @ 65mA is required.
- For currents over 120 Amps, supply voltage to CT must be at least 15V to maintain accuracy.
- Minimum Warm-up Time is 8-10 seconds.

Span Setting

The H971 comes preset at the maximum (0-200A) span. To adjust the H971 to a different span, locate the potentiometer on the top of the device. This potentiometer is a multi-turn device, taking about 23 turns to adjust the span from ±20A to ±200A. Use the potentiometer to adjust the maximum amperage range used by the sensor.

The smallest amperage range (0 to ±20 A) is set by turning the potentiometer fully counterclockwise; the greatest amperage range (0 to ±200 A) is set by turning the potentiometer fully clockwise.

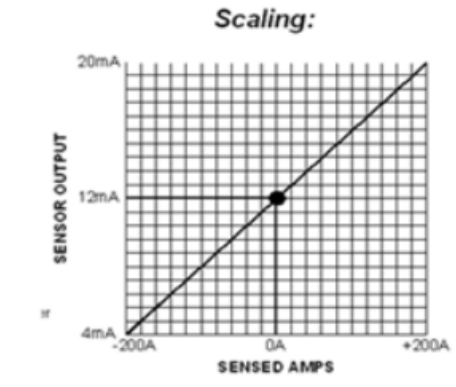
To determine the best amperage range for an application, first set the load to the maximum amperage that will be used. Use the LED as a guide to adjust the potentiometer to its optimum setting. Verify the measured output current matches the load current using a current clamp meter.

LED Activity	Potentiometer Adjustment
Steady green blink	Turn CCW until LED blinks rapidly, then slowly turn CW just until blink returns to steady rate.
Rapid green blink	Turn CW until LED blinks at a steady rate.

For an alternate method, see the Veris Installation Manual:

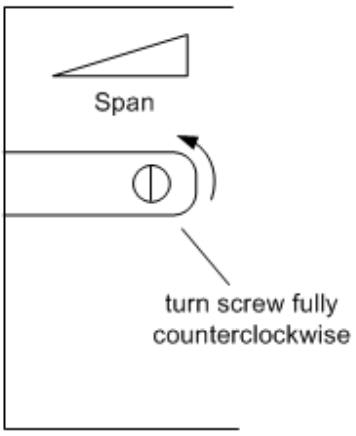
http://www.veris.com/docs/Installs/h971_971SP_i0d2.pdf

Scaling Graph

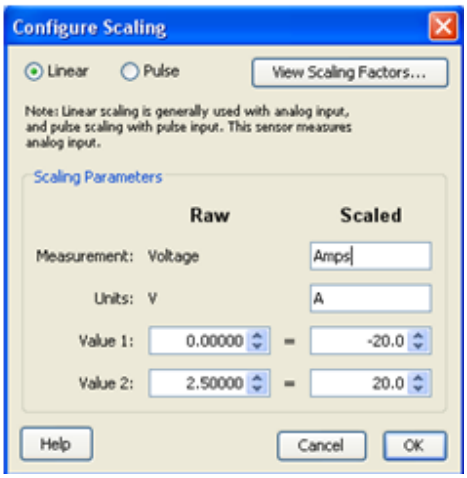


0-20mA

Potentiometer on transducer

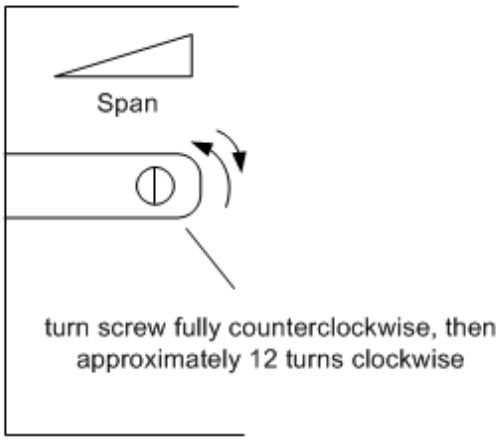


Values in Configure Scaling Window

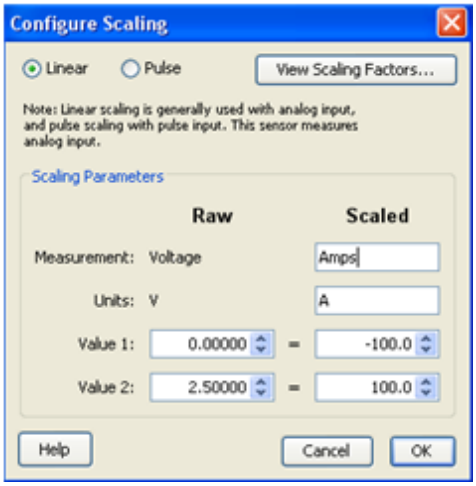


0-100mA

Potentiometer on transducer

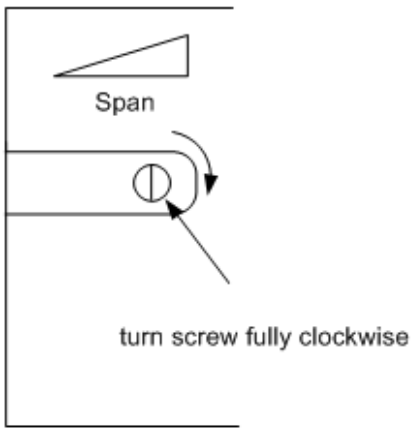


Values in Configure Scaling Window

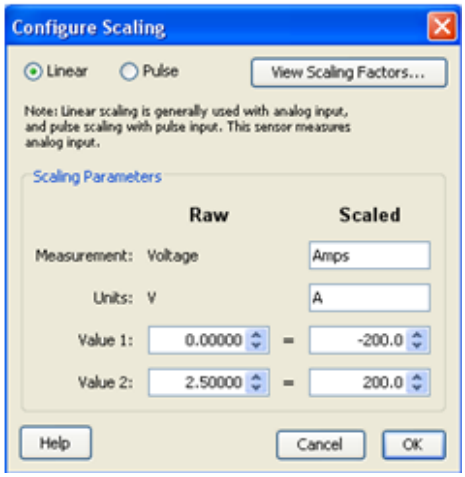


0-200mA

Potentiometer on transducer



Values in Configure Scaling Window



Veris Scaling Factors: T-VER-PXU-L/T-VER-PXU-X

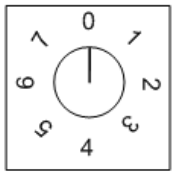
These Veris differential pressure transducers use Linear Scaling, mA or Volts -> "WC".

The analog output for these Veris sensors is determined by which screw terminals are connected either to a CABLE-4-20mA or to CABLE-ADAP5 or to CABLE-ADAP10. See the documentation that came with the hardware for details.

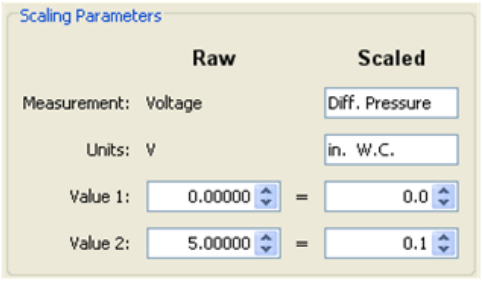
Both models have switch-selectable ranges and scales. The examples below show the scaling parameters you enter in the Configure Scaling window for the supported output ranges and raw values.

0 - 0.1 in. W.C.

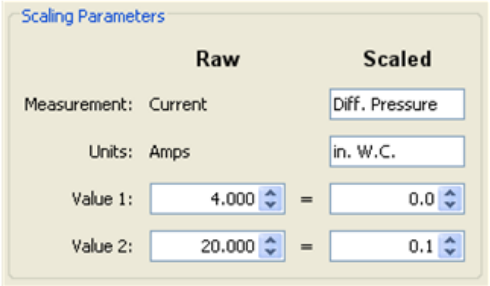
Range Setting on Sensor



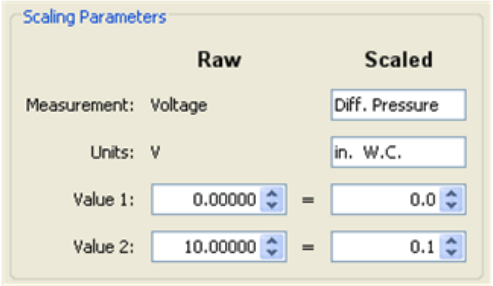
0 = 0 - 0.1 in. W.C.



Voltage: 0 - 5 V

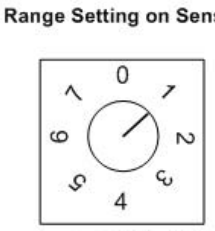


Current: 4 - 20mA

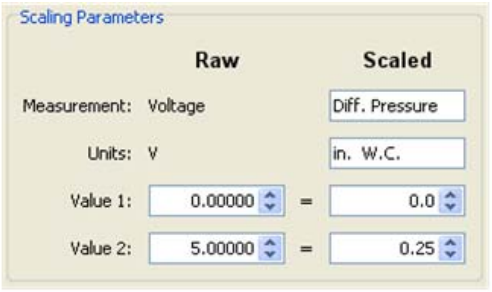


Voltage: 0 - 10 V

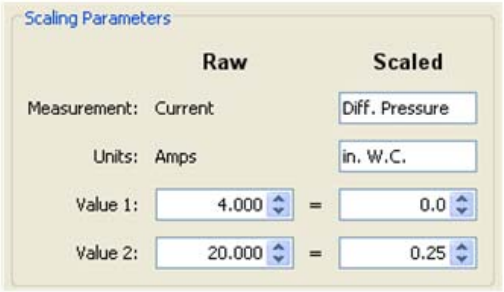
0 - 0.25 in. WC



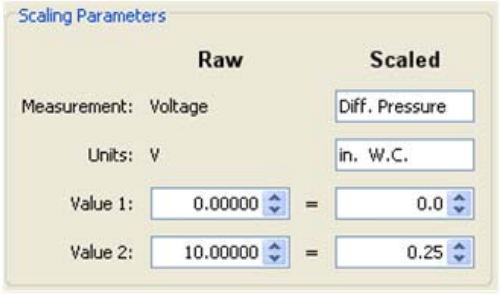
1 = 0 - 0.25 in. W.C.



Voltage: 0 - 5 V



Current: 4 - 20mA



Voltage: 0 - 10 V

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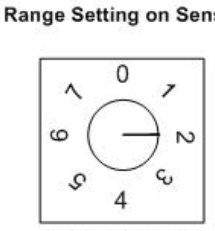
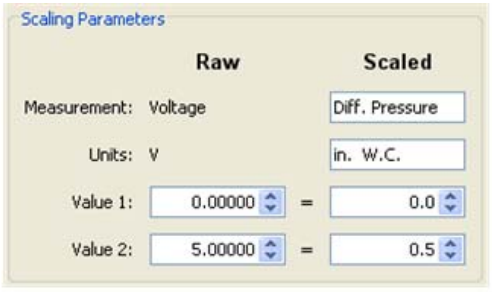
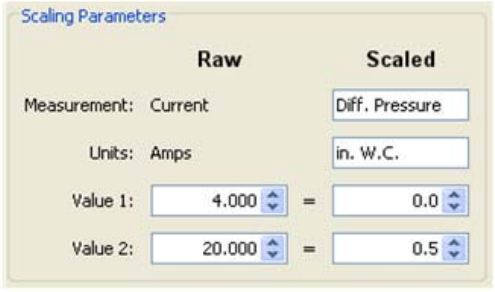
0 - 0.5 in. WC



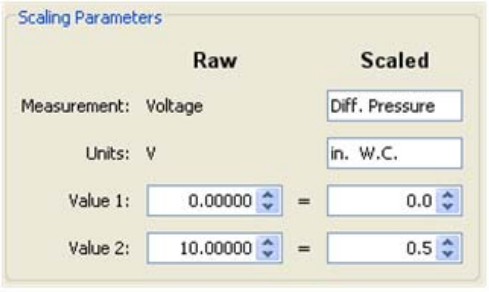
2 = 0 - 0.5 in. W.C.



Voltage: 0 - 5 V



Current: 4 - 20mA



Voltage: 0 - 10 V

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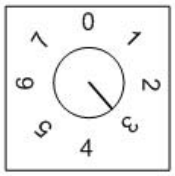
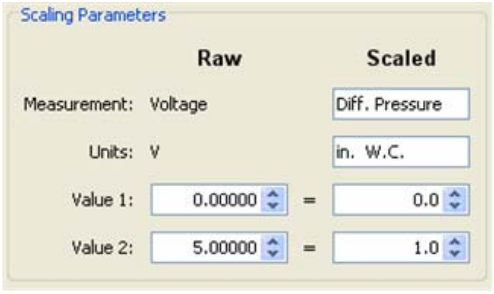
0 - 1.0 in. WC

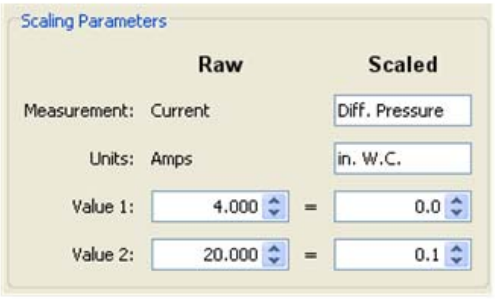
Range Setting on sensor



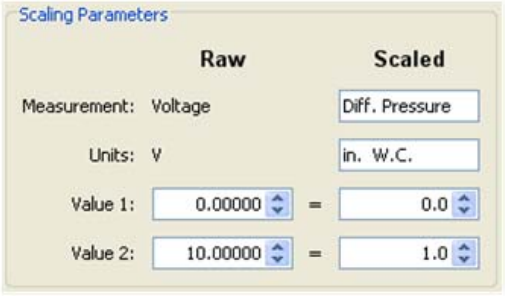
3 = 0 - 1.0 in W.C.



Voltage: 0 - 5 V



Current: 4 - 20mA

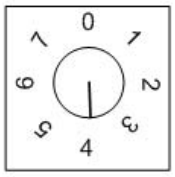


Voltage: 0 - 10 V

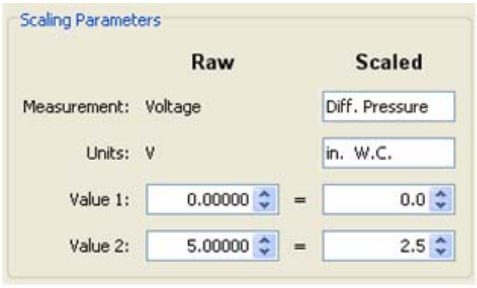
---

0 - 2.5 in. WC

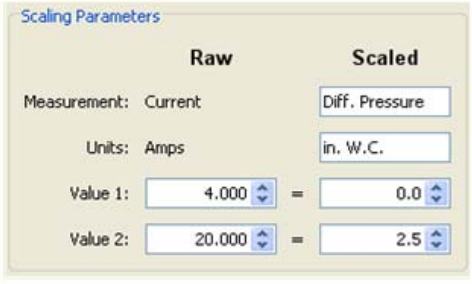
Range Setting on sensor



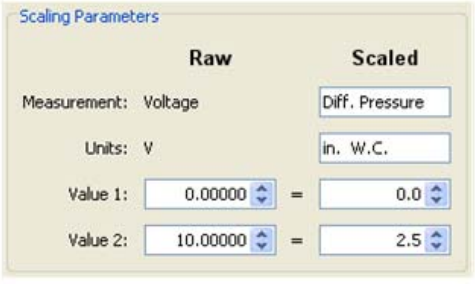
4 = 0 - 2.5 in. W.C.



Voltage: 0 - 5 V



Current: 4 - 20mA

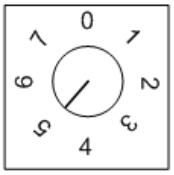


Voltage: 0 - 10 V

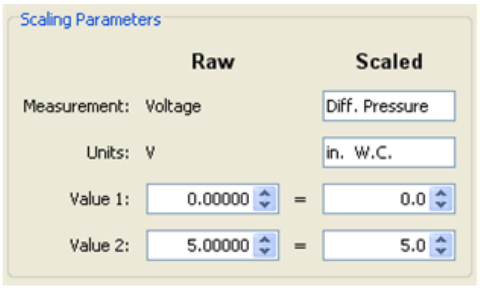
---

0 - 5.0 in. WC

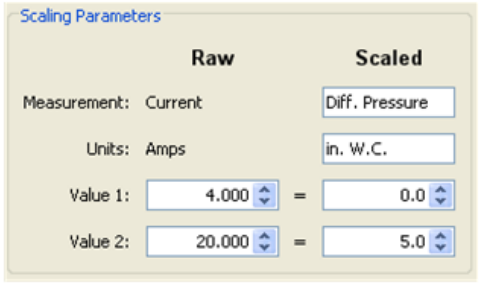
Range Setting on sensor



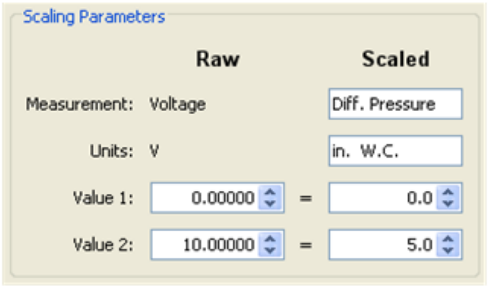
5 = 0 - 5.0 in. W.C.



Voltage: 0 - 5 V



Current: 4 - 20mA

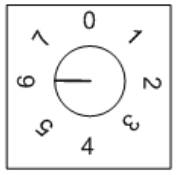


Voltage: 0 - 10 V

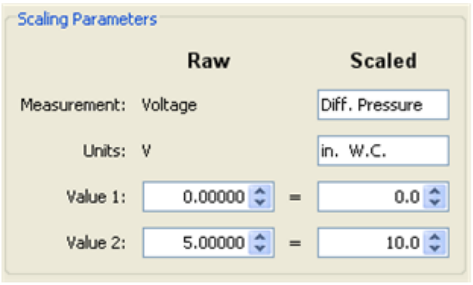
---

0 - 10.0 in. WC

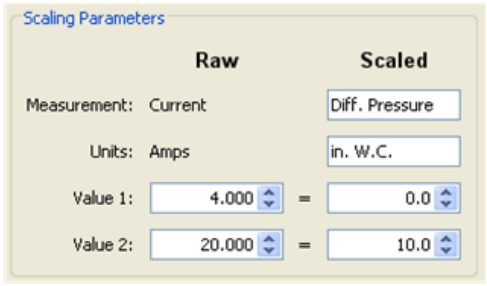
Range Setting on sensor



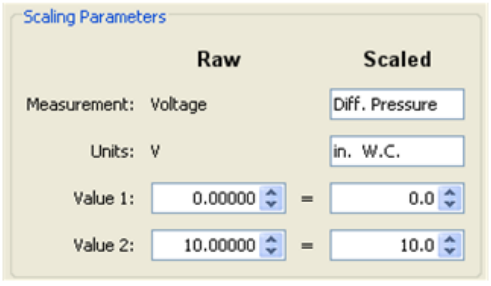
6 = 0 - 10.0 in. W.C.



Voltage: 0 - 5 V



Current: 4 - 20mA



Voltage: 0 - 10 V

Ion Scaling Factors: ION-TVOC

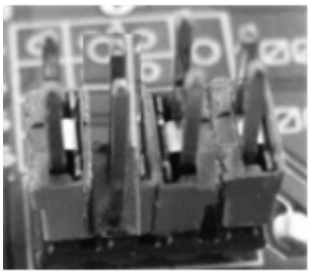
The ION-TVOC uses Linear Scaling, mA -> ppm.

NOTES

- Requires Loop power of 22 mA. Lamp and electronics require 65 mA.
- An AC-DC power adapter with a minimum of 6W @ 35mA is required for excitation power.

0-10 ppm

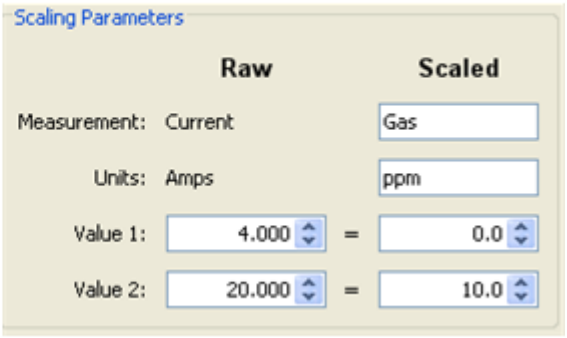
Hardware Setting



A B C D

pin B removed = 10 ppm

Configure Scaling values



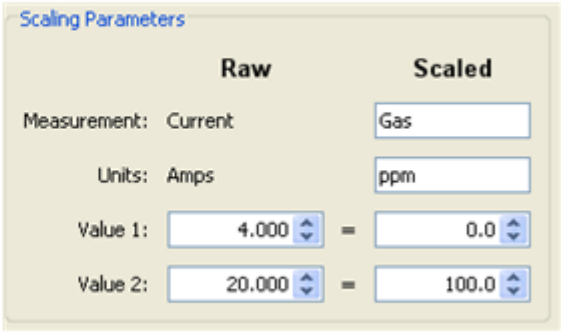
0-100 ppm

Hardware Setting

A B C D

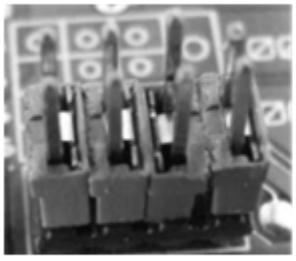
pin C removed = 100 ppm

Configure Scaling values



0-1000 ppm

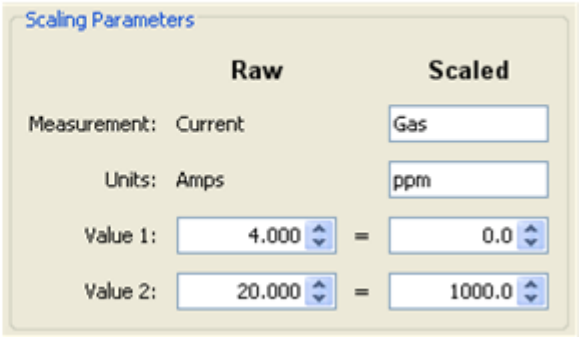
Hardware Setting



A B C D

all pins installed = 1000 ppm

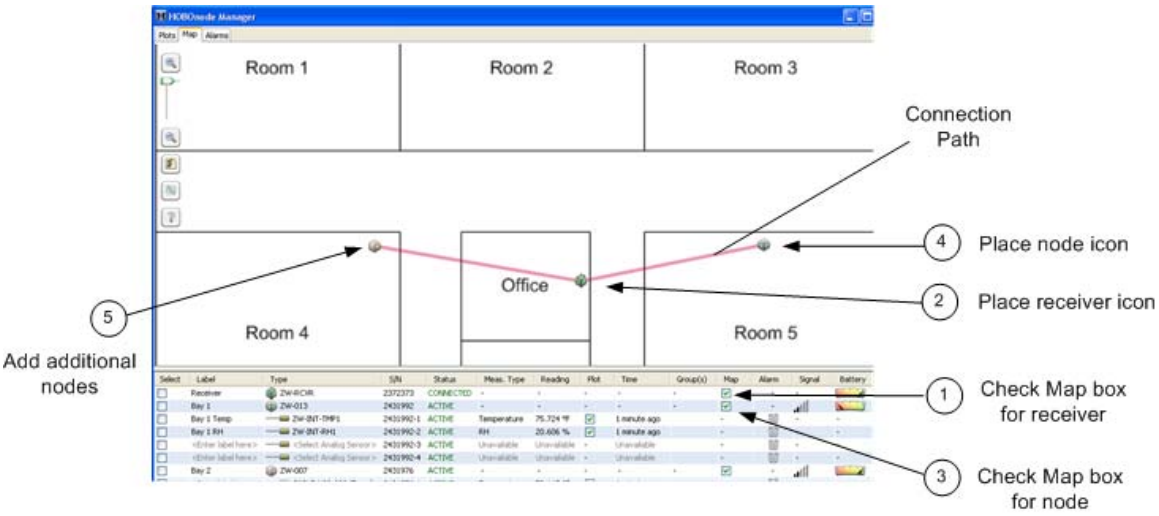
Configure Scaling values



The Network Map

Adding a Device to the Network Map

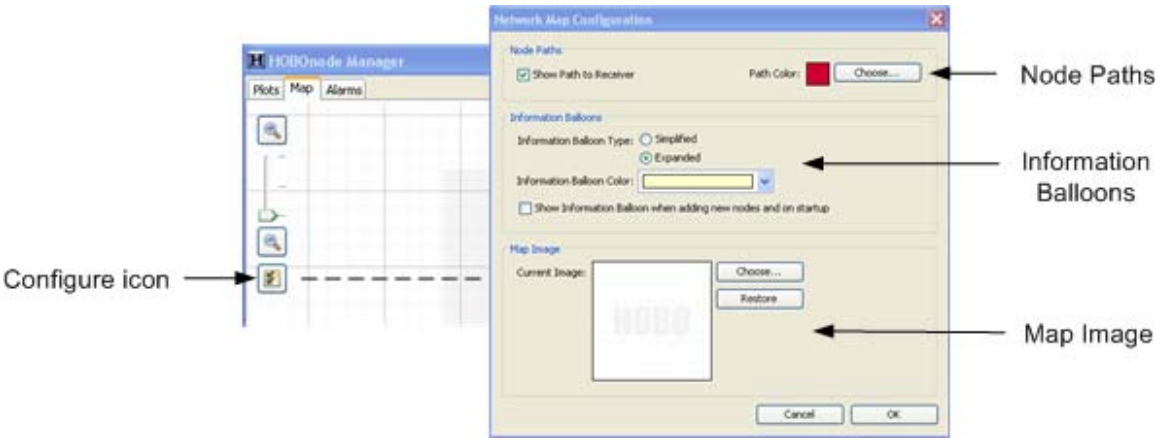
For an overview of the network map, see The Network Map (page 131).



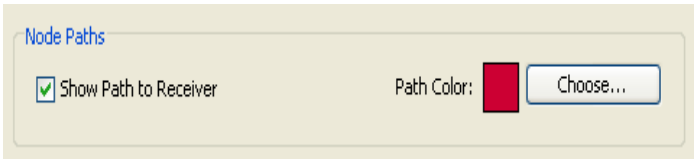
1. In the Device Table, check the **Map** box for the receiver to add it to the map.
2. Move the icon to the location of the receiver and click the left mouse button.
3. Check the **Map** box for a node to add it to the map.
4. Move the icon to the location of the device and click the left mouse button.
5. Repeat steps 3 and 4 for each node you want to add to the map.

Configuring the Network Map

Click the **Configure** icon in the top left of the Network Map to open the Network Map Configuration window.



Node Paths



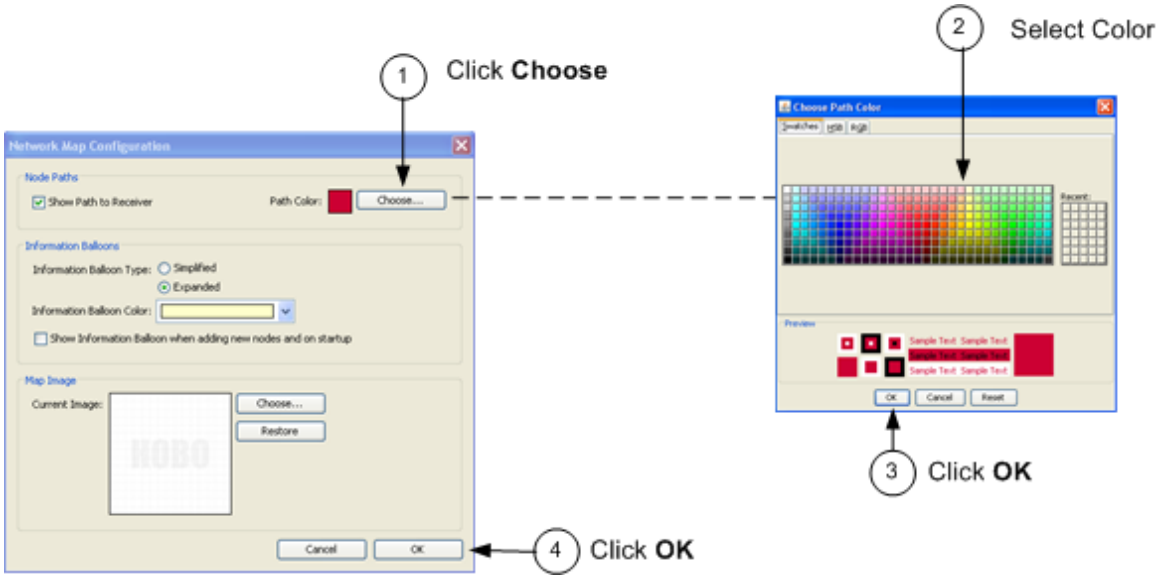
Show Path to Receiver

Paths are shown by default. Uncheck this box to hide connection paths between nodes.

Path Color

To change the path to a color that works better with your map background:

1. Click **Choose** on the Network Map Configuration window.



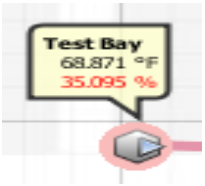
2. In the Choose Path Color window, select the desired color.
3. Click **OK** to close the Choose Path Color window.

4. Click **OK** to close the Network Map Configuration window.

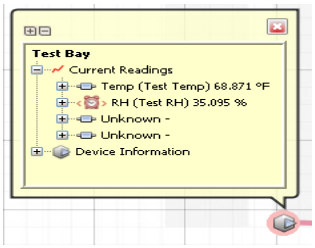
Information Balloons

Information Balloon Type

- Simplified - shows only label and readings.

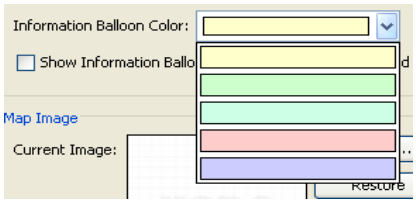


- Expanded - shows all device information



Information Balloon Color

Click the arrow to select a color for the Information Balloons that works best with your Map background color.



Show Information Balloon when adding new data nodes and on startup

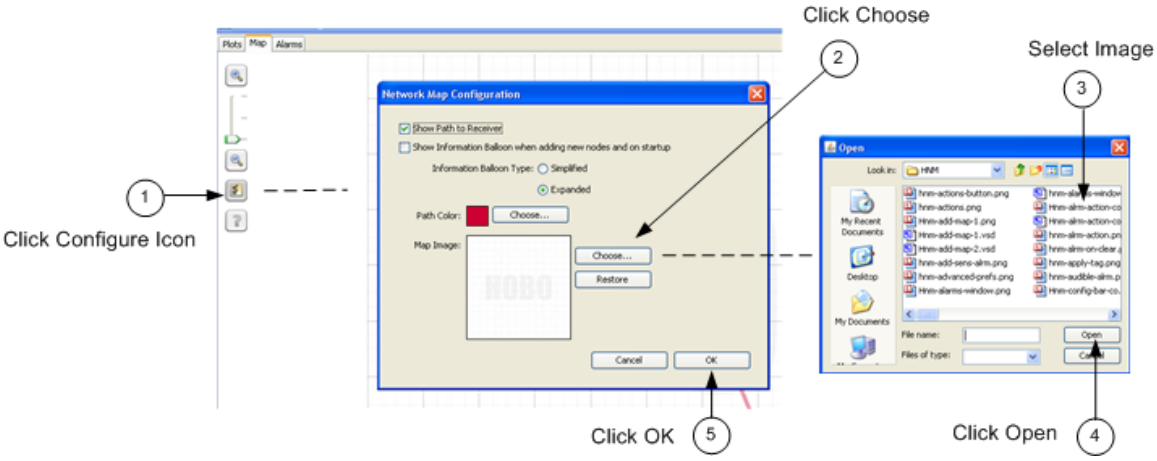
Check this box to have balloons automatically appear when you add a data node to the map.

Map Image

To change the map image, see Customizing the Network Map Background on page 177.

Customizing the Network Map Background

You can upload a custom image to the Network Map to represent your floor plan.



1. Click the **Configure** icon in the top left corner of the map.
2. Click the **Choose** button in the Network Map Configuration window.
3. Select the image file from the Open window.
4. Click **Open**.
5. Click **OK** to close the Network Map Configuration window and display the new image.

To revert to the default image, click **Restore**.

Custom Network Map Guidelines

If you don't have an image to upload, you can create one using any drawing program, following these guidelines.

Image Size

There are 3 scale levels available for an image in the Network Map, depending on the size of the image you upload. The larger the size, the more zoom levels you will have.

1,000 x 1,000 (minimum size) - 1 zoom level

2,000 x 2,000 - 2 zoom levels

3,000 x 3,000 (maximum size) - 3 zoom levels

General Image Guidelines

- All images are converted to squares in the Network Map, so for best results your overall image should be a square.
- Inside the main square, add a smaller square or rectangle to roughly represent your building.
- Add squares or rectangles to represent rooms in your building where you will place nodes. Add descriptive labels to each room such as "Office," "Cooler," or "Boiler Room." Some programs will also have other images you can add to the room such as desks and computers to help you narrow the location of the node.
- Set the properties of the image to your desired resolution. For best results enter 4,000 x 4,000 pixels.

Working with Data

Viewing Real-Time Plots

In the plots window you can view sensor data in real-time plots. You can plot a maximum of 20 sensors at once.

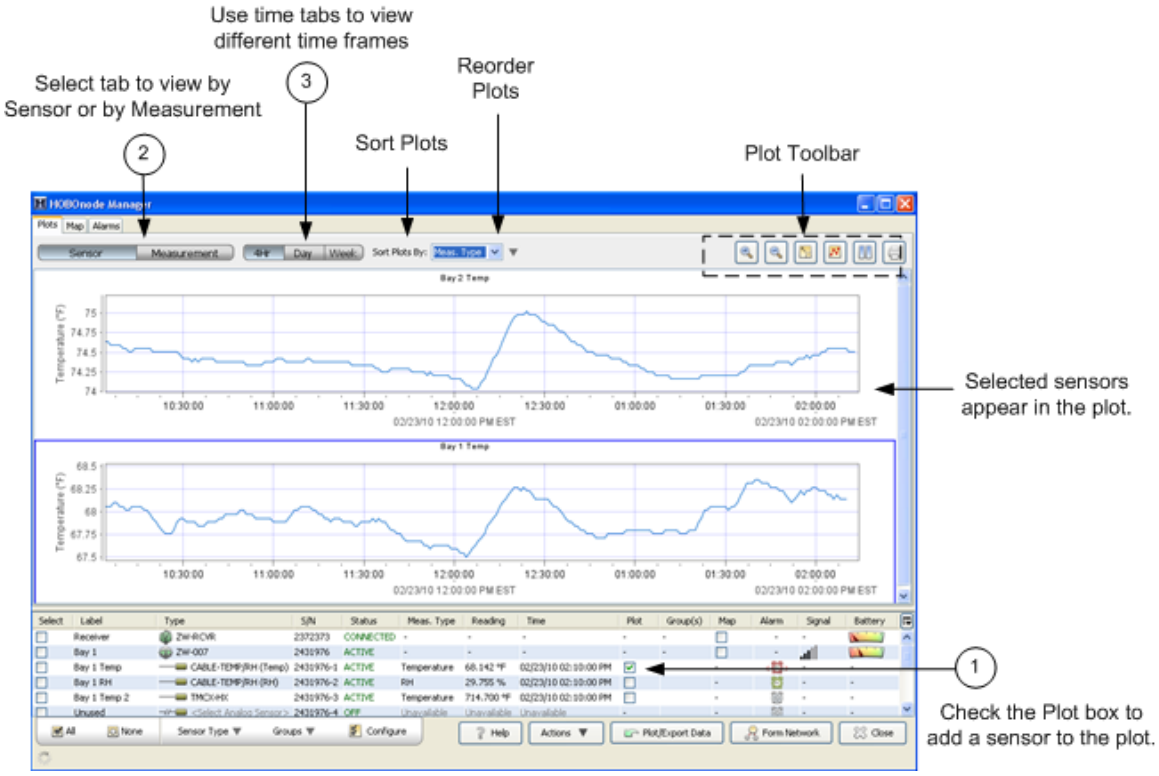
To view the real-time plot for sensors:

1. Select the Plot box in the Device Table for each sensor you want to view.
2. Select Sensor or Measurement view tab.

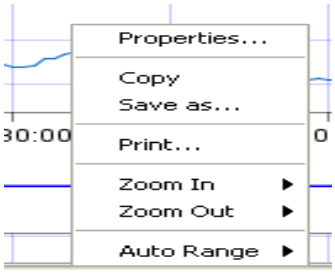
   In Sensor View, there is a separate plot for each sensor.

   In Measurement View, there is one plot for each Measurement Type (such as temperature), which may contain separate entries for multiple sensors.

3. Change the time frame of the plot using the Time Frame tabs.


Use time tabs to view different time frames
Select tab to view by Sensor or by Measurement
3
2
Reorder Plots
Sort Plots
Plot Toolbar
Selected sensors appear in the plot.
1
Check the Plot box to add a sensor to the plot.

- Use the Sort Plots By drop-down list to change the order of the plots.
- Use the Reorder Plots arrow to reverse the order of plots.
- Use the Plot Toolbar to zoom in or out, pause the plot, or print the plot.
- Right-click on a plot to access a menu with the following options:



Plotting Preferences

To change preferences that apply to real-time plots only, see Real-Time Plot preferences.

Use Plotting Preferences to change the appearance of plots. To apply changes to real-time plots, re-start HOBOnode Manager or uncheck the sensor Plot box and then re-check. To open the Plotting Preferences, from the main HOBOware menu select File > Preferences and then click the Plotting tab.

Plotting or Exporting Wireless Data

With HOBOnode Manager, you can view data and plots from your HOBO data node wireless network in real time, but you also have the ability to plot or export previously logged data. Using the Plot/Export Wireless Data capability, you can plot data directly in HOBOware or you can export it to a text or .csv file to open in another program for further analysis. You can pinpoint the exact data you wish to plot or export, allowing you to view data from:

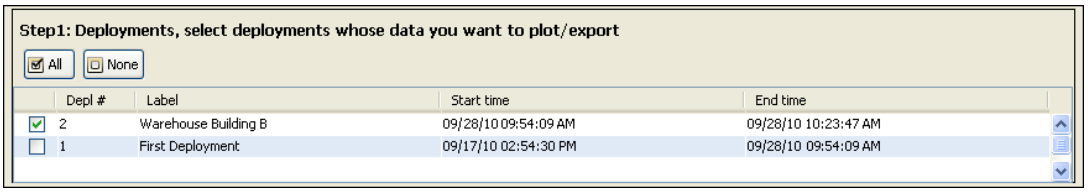
- Current and/or previous network deployments,
- Specific data nodes,
- A subset of certain sensors from selected data nodes,
- Groups of data nodes as configured in HOBOnode Manager, and
- A specific date range or timeframe.

In addition, you can save frequently used settings for quick plotting and exporting in the future and for use with data delivery, which allows you to share data automatically via email, FTP, or saved to a drive on a regular schedule.

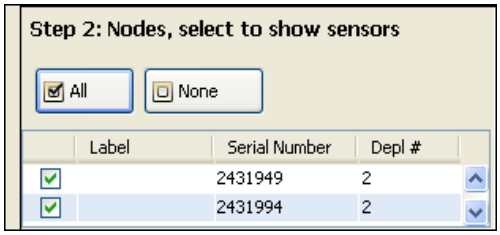
To open the Plot/Export Wireless Data tool, click the **Plot/Export Data** button in HOBOnode Manager (or from the **File** menu in HOBOware, select **Plot/Export Wireless Data**).

To use the Plot/Export Wireless Data tool:

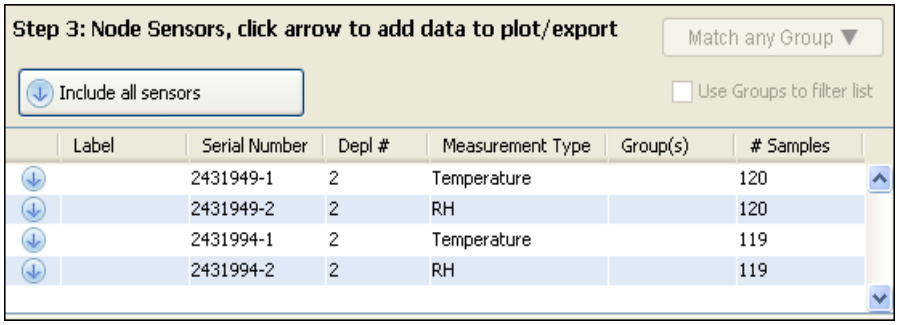
1. Select the deployment that contains the data you wish to plot or export.



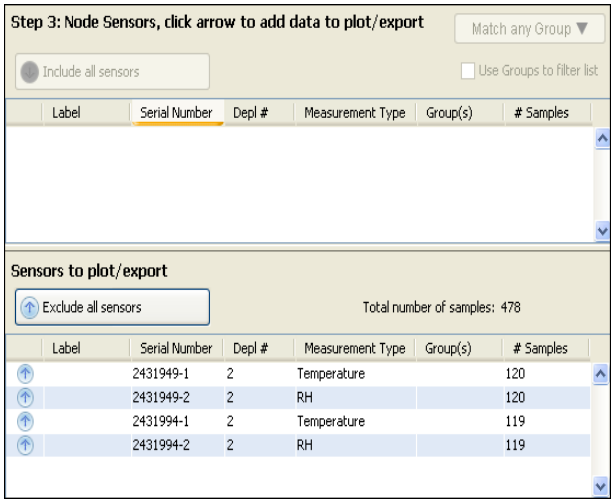
2. Select the data nodes with the sensors whose data you wish to plot or export.



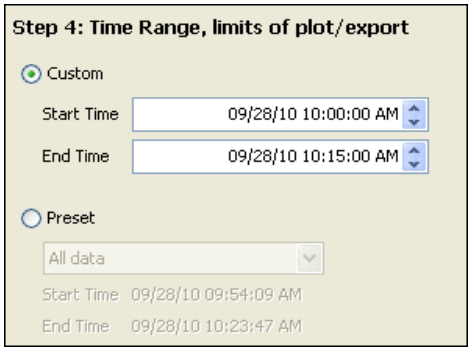
3. Each sensor for the data node that you selected in Step 2 will appear in a list as shown below. Click the down arrow icon for each sensor you wish to plot or export, or click **Include all sensors** if you want to plot or export data from all sensors in the list. **Note:** If you have set up groups in HOBOnode Manager, you can also sort and select sensors within those groups. See Using Groups in the Plot/Export window on page 184.



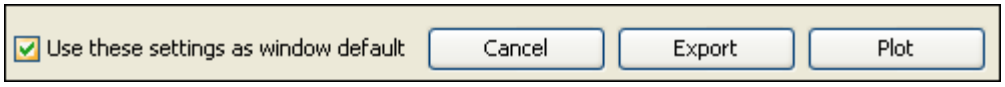
The sensors that you selected will move from the top half of the Step 3 pane to the bottom half as shown below. In this example, all sensors were included and are now shown in the "Sensors to plot/export" list. If you wish to make changes, you can either click the up arrow icon remove a specific sensor from the list, or click **Exclude all sensors** to move all the sensors back to the top (you'll then need to select the sensors you wish to plot or export again).



4. Choose the time range for the data you wish to plot or export. Select Custom and specify your own start and end time, or select Preset and choose one of several pre-defined ranges from the drop-down list.

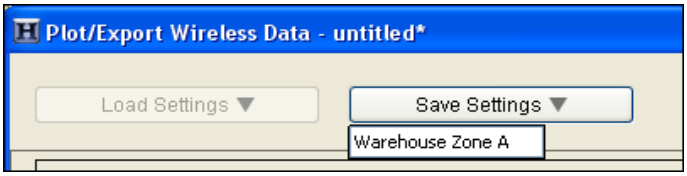


5. Once you have all the settings selected, click the **Export** or **Plot** button. Clicking the Export button will open the Export Options dialog, where you can choose to save the data to a single file or to multiple files. Clicking the Plot button opens the Plot Setup dialog, where you can select the series that will appear in the graph in HOBOware.



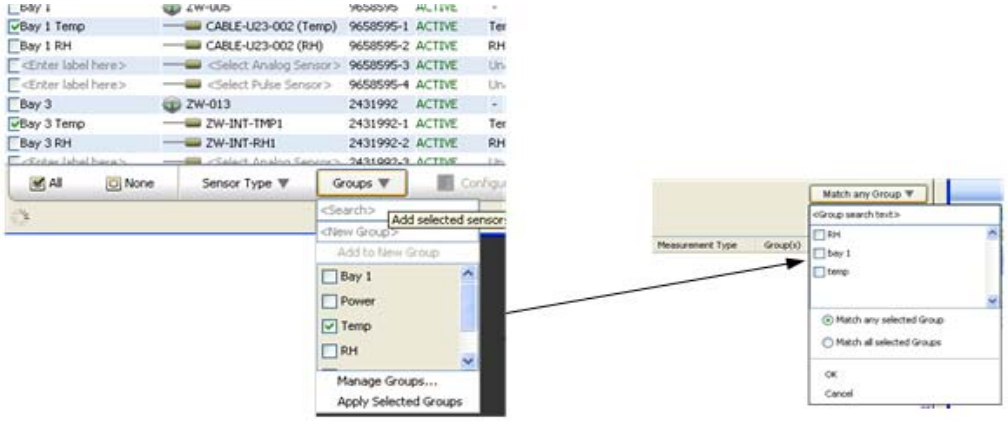
Notes:

- If you want the current settings to always appear in the Plot/Export Wireless Data window, then select the **Use these settings as window default** checkbox.
- You can save different combinations of settings to a configuration file in the Plot/Export Wireless Data window for future use, or for use by the data delivery feature. Click the **Save Settings** button, type a name, and press Enter. Then click the **Load Settings** button and choose the configuration file you wish to use for the current plot or export.



Using Groups to Sort Sensors

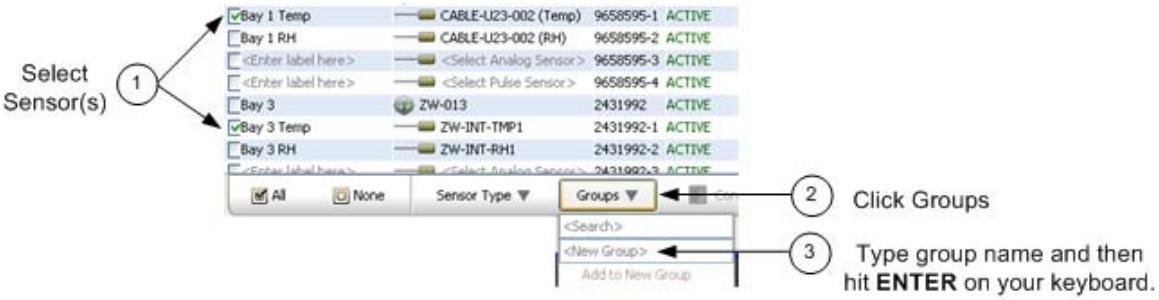
You can assign sensors to groups in the Device Table and then use them to sort rows in the table, or to refine a list of sensors in the Plot/Export Wireless Data window.



Apply Groups in the Device Table

Use Groups sort sensors in the Plot/Export Data Window

Creating Groups and Adding Sensors

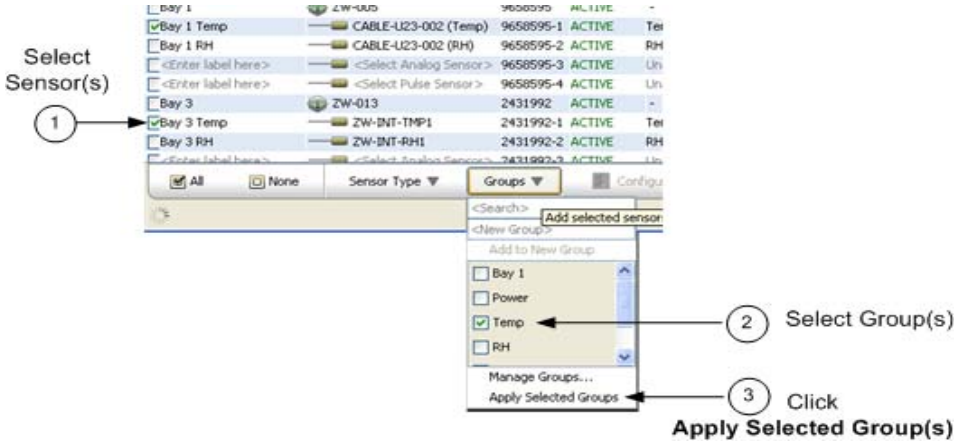


1. In the Device Table select the sensor(s) you want to add to a group.
2. Click **Group**s.
3. In the <New Group> box enter a name for the group and then click the **ENTER** key on your keyboard.

The Group Name appears in the table for each sensor selected.

Adding Sensors to a Group

To add a sensor to an existing group:

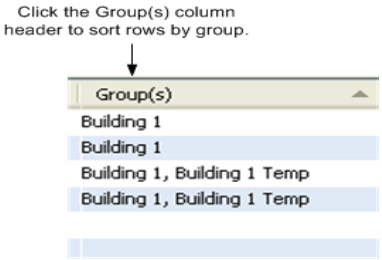


1. Select the sensor(s).
2. Click **Groups**.
3. Check desired groups(s).
4. Click Apply Selected Groups.

See Using Groups in the Plot/Export Data Window.

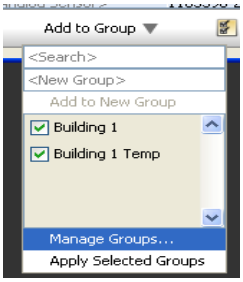
Sorting by Group

Click the Group(s) column header to sort rows by groups.


Click the Group(s) column header to sort rows by group.
Group(s)
Building 1
Building 1
Building 1, Building 1 Temp
Building 1, Building 1 Temp

Deleting or Renaming a Group

Select Manage Groups from the Groups drop-down.



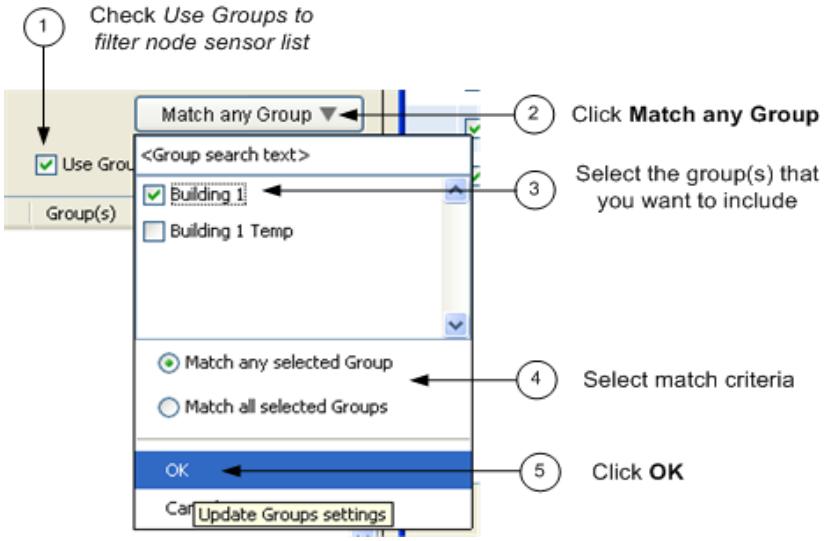
The Manage Groups window appears.

- To change the name of the group click the Edit icon and enter the new name.
- To delete a group, click the X.

Using Groups in the Plot/Export Wireless Data Window

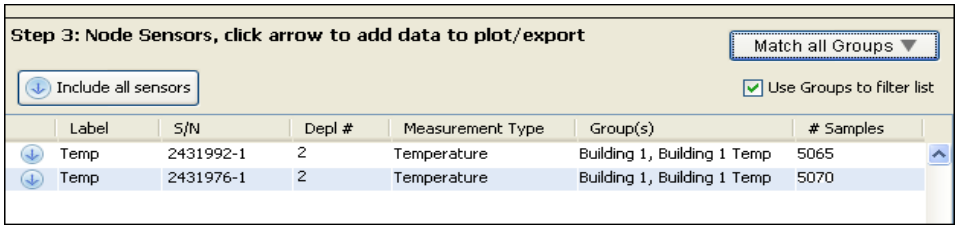
Once you have set up groups in the Device Table, you can use them to refine the list of available sensors in the Plot/Export Wireless Data window.

To set up groups, see Using Groups to Sort Sensors.

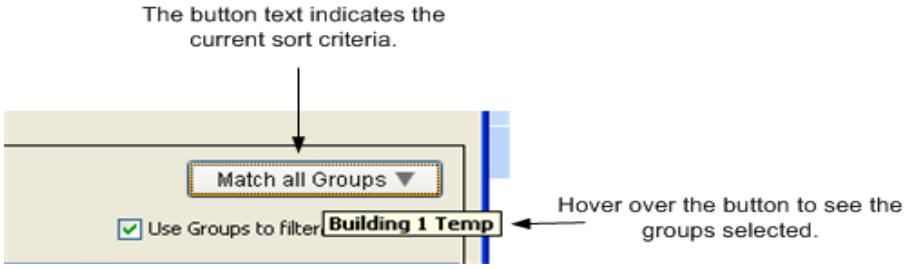


1. Check the *Use Groups to filter list* box.
2. Click the Match any Group button.
3. Select Groups
    a. Select the groups that you want to include in the list.
4. Select the Match Criteria
    a. Match any selected Group - Any sensors that are a member of any of the groups selected will appear.
    b. Match all selected Groups - Only sensors that are a member of all of the groups selected will appear.
5. Select **OK**.

Only the sensors that match the group criteria will appear in the Node Sensors list.



Viewing Current Sort Criteria


The button text indicates the current sort criteria.
Match all Groups
Use Groups to filter
Building 1 Temp
Hover over the button to see the groups selected.

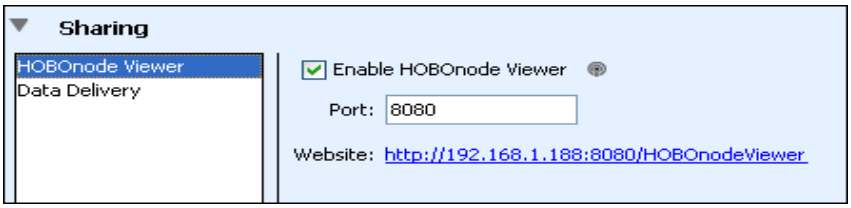
Enabling and Disabling HOBOnode Viewer

To access HOBOnode Viewer, you must first enable that feature within HOBOware preferences on the computer running a data node network. This will create a link to a HOBOnode Viewer web page that you can use and share with others. If you have not already set up a data node network using HOBOnode Manager, you must do that first and then you will be able to activate HOBOnode Viewer from the same computer.

Windows note: If Windows Firewall is enabled on your computer, you may need to adjust the security settings to allow access to HOBOware before enabling HOBOnode Viewer. To check this, open Control Panel, go to Security, and select Allow a program through Windows Firewall (or click Windows Firewall and click the Exceptions tab on some versions of Windows). Make sure HOBOware is selected in the allowed access/exceptions list.

To enable HOBOnode Viewer:

1. Open the preferences for data nodes. From HOBOnode Manager, click the **Actions** button and select **Edit HOBO Data Node Preferences**. Or, to access preferences within HOBOware, select **File > Preferences** on Windows or **HOBOware > Preferences** on Macintosh and click **Data Nodes**.
2. Click **Sharing** within the Data Nodes preferences, and then click **HOBOnode Viewer**.
3. Select the Enable HOBOnode Viewer checkbox.



4. By default, the port number assigned for HOBOnode Viewer is 8080. You may use this one or change it to any other available port. In most cases, the default 8080 port number will be available. However, if this number is already in use by another web service application on the same computer, then you can change it to any other available port. There are 0 to 65,535 ports. Port numbers 0 to 1023 are restricted ports reserved for use by system services, such as FTP, Telnet, and HTTP. You may use any other available port number from 1024 to 65,535 for HOBOnode Viewer.
5. Click **OK** in preferences and then restart HOBOnode Manager (close HOBOnode Manager and then from the **Device** menu in HOBOware, select **Manage HOBO Data Node Network** to reopen it). HOBOnode Viewer will not be fully enabled until you restart HOBOnode Manager.

6. After HOBOnode Manager has restarted, return to the HOBOnode Viewer preferences. Click the link, or URL, to go to your HOBOnode Viewer web page.

The URL has the following structure:

htttp://<IP address>:<port number>/HOBOnodeViewer

where <IP address> is the IP address for the computer where your data node network is running and <port number> is the port assigned for the HOBOnode Viewer in preferences.

To share the URL with others, click the link and then copy the URL from your browser and paste it an email message to send to others who would like to view your data node network.

Note: HOBOnode Viewer is only available while HOBOnode Manager is running. If you close HOBOnode Manager and then attempt to access HOBOnode Viewer, the web page will not open. Also note that the HOBOnode Viewer will not be available outside your local area network unless you expose that computer outside of the network. Contact your IT department if you would like to expose the HOBOnode Viewer.

To disable HOBOnode Viewer:

1. Open the preferences for data nodes. From HOBOnode Manager, click the **Actions** button and select **Edit HOBO Data Node Preferences**. Or, to access preferences within HOBOware, select **File > Preferences** on Windows or **HOBOware > Preferences** on Macintosh and click **Data Nodes**.
2. Click **Sharing** within the Data Nodes preferences, and then click **HOBOnode Viewer**.
3. Deselect the Enable HOBOnode Viewer checkbox.
4. Click **OK** in preferences and restart HOBOnode Manager.

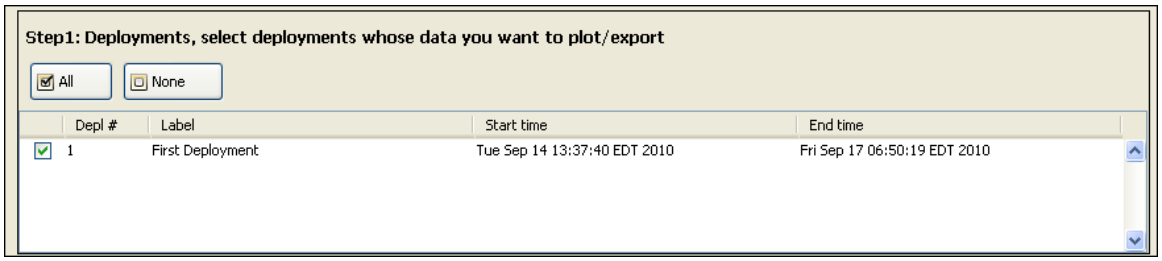
Setting up Data Delivery

With data delivery, you can automatically save recorded sensor data from nodes in your network to a single .txt, .csv, or .xls file on a regular schedule. This allows you to:

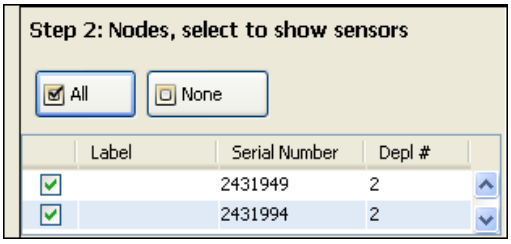
- Store data from your current data node network deployment for future reference and analysis,
- Access data remotely when you are away from the network, and
- Share data with others in a file that is distributed automatically via FTP or email, or saved to a computer or network drive.

Before you can set up data delivery, you must first select which nodes and sensors you wish to include in the file by saving the configuration settings. To do this:

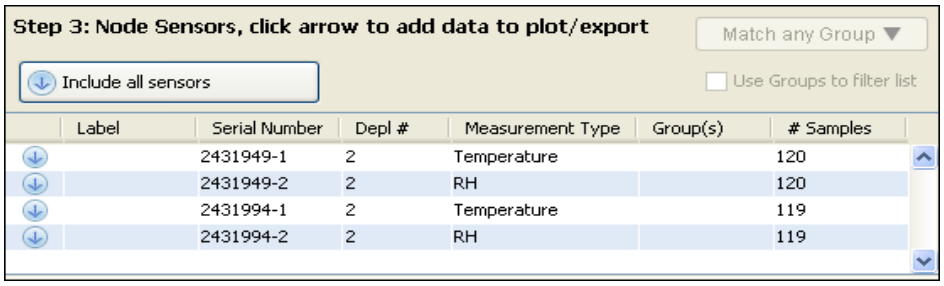
1. From HOBOnode Manager, click **Plot/Export Data**.
2. Select the deployment name from the list.



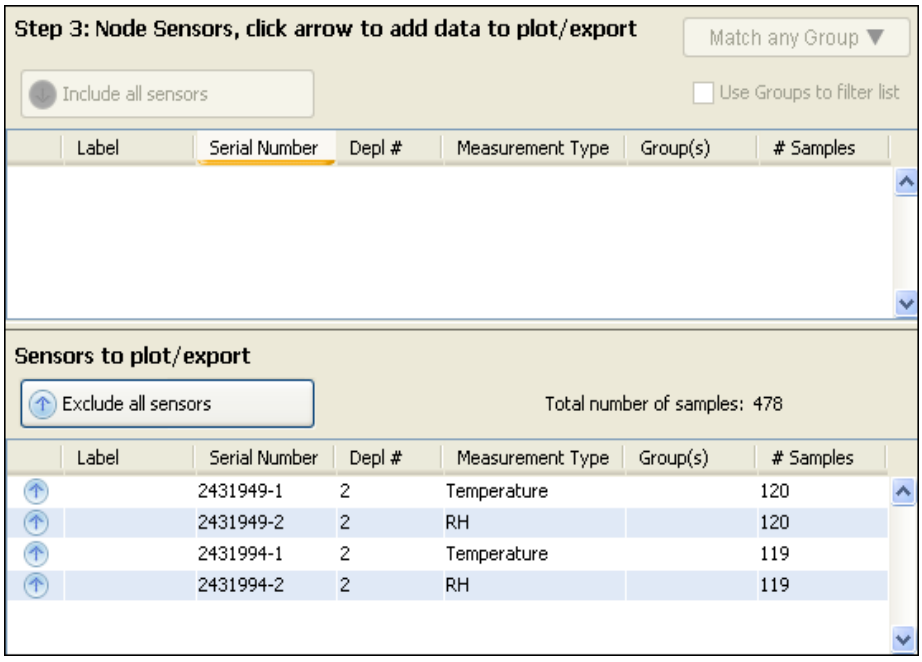
3. Select the individual nodes you would like to include in the file or click All to select all nodes.



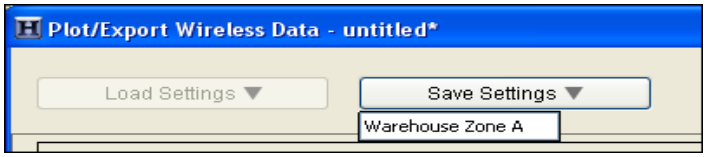
4. Select the sensors you would like to include in the file or click **Include all sensors**.



5. Make sure all the sensors you wish to share in your datafile appear in the Sensors to plot/export list.



6. Click **Save Settings** and type a name, which will also be used for the data delivery file name, and press Enter. Your configuration settings will be saved. You do not need to set up a time range (Step 4 in the Plot/Export Wireless Data window) at this time because those settings do not apply to data delivery. Step 4 only applies to immediate plotting and exporting.

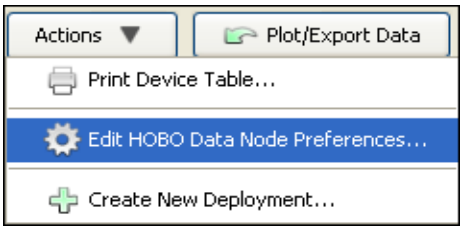


After you have selected the sensors you wish to include in the shared data file, you can then set up data delivery within Preferences.

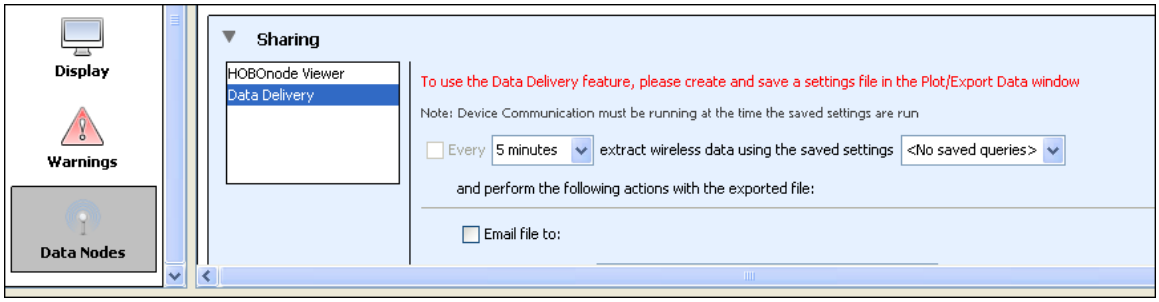
To do this:

1. Open HOBOnode Manager.

2. Click the **Actions** button and select **Edit HOBO Data Node Preferences**.

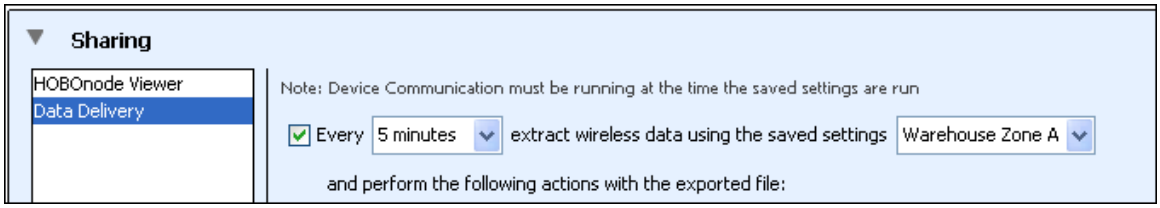


3. Select **Sharing**, and then select **Data Delivery**.


Display
Warnings
Data Nodes
Sharing
HOBOnode Viewer
Data Delivery
To use the Data Delivery feature, please create and save a settings file in the Plot/Export Data window
Note: Device Communication must be running at the time the saved settings are run
Every
5 minutes
extract wireless data using the saved settings
<No saved queries>
and perform the following actions with the exported file:
Email file to:

Note: If you have not yet selected the sensors you wish to export, then you will see a message indicating you need to create and save a settings file. You must select the sensors in Plot/Export Wireless Data before continuing.

4. Select how often you want to save the data from your network, from 1 minute to 7 days. This will determine what schedule you use to share the data.

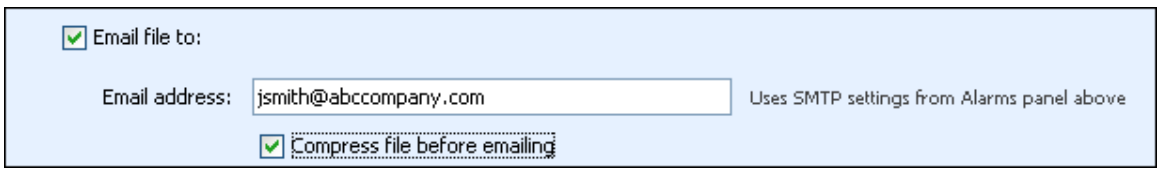

Sharing
HOBOnode Viewer
Data Delivery
Note: Device Communication must be running at the time the saved settings are run
Every
5 minutes
extract wireless data using the saved settings
Warehouse Zone A
and perform the following actions with the exported file:

5. Select the name of the saved settings that you created in Plot/Export Wireless Data, such as "Warehouse Zone A" in the example above.

6. Select how you would like to share the file: via email, FTP, or saved to a computer or network location. You may select more than one method of sharing the file.

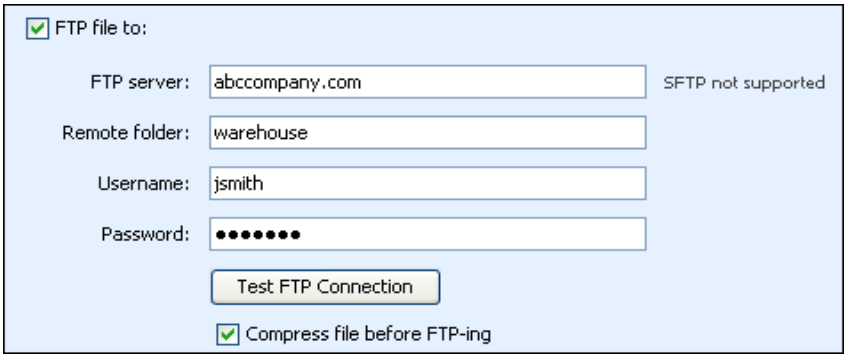
Email:

Type the email address where you want to send the file and select the checkbox if you want to compress the file before emailing it. **Note:** Data delivery uses the same email settings configured for alarm email notifications. If you have never configured an alarm email, you must do that first, even if you don't plan on setting any alarms.



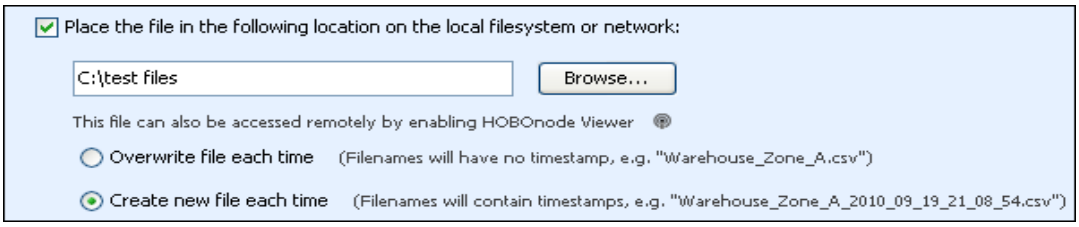
FTP:

Enter the FTP server name, the directory name (remote folder), username, and password for the FTP location where you want to place the file. Test the FTP Connection to make sure it successfully delivers the file to the specified location. Select the checkbox if you want to compress the file before delivering it via FTP.

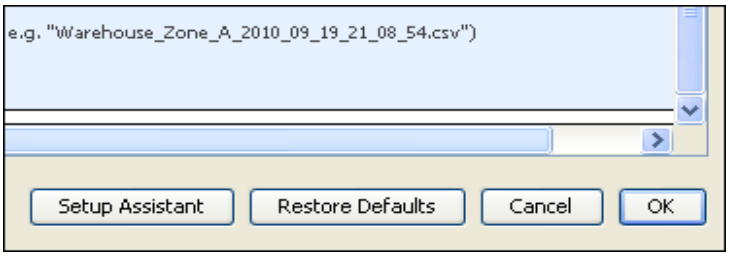


Saving it to a hard drive or network:

Select the directory where you want to save the files. Choose whether you want to overwrite the file each time a file is saved, or if you want to create a new file each time.


Place the file in the following location on the local filesystem or network:
C:\test files
Browse...
This file can also be accessed remotely by enabling HOBOnode Viewer
Overwrite file each time
(Filenames will have no timestamp, e.g. "Warehouse_Zone_A.csv")
Create new file each time
(Filenames will contain timestamps, e.g. "Warehouse_Zone_A_2010_09_19_21_08_54.csv")

When you are done configuring your data delivery settings, click **OK** in the main Preferences window.



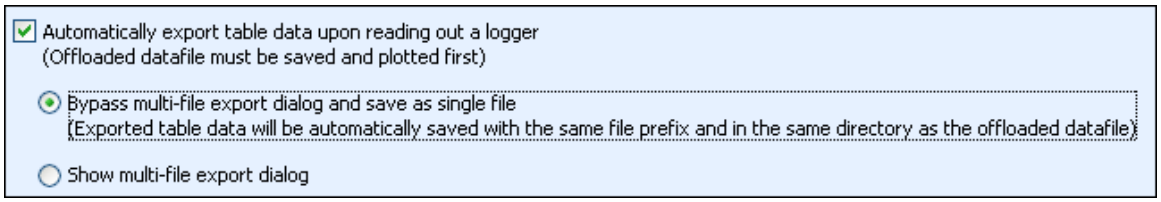
The sensor data from your data network will then be saved and shared on the schedule that you selected. The data will be saved as a .txt, .csv, or .xls file that you can import into HOBOware, Microsoft Excel, and other programs for analysis. The file type is determined by the export settings in Preferences.

Notes:

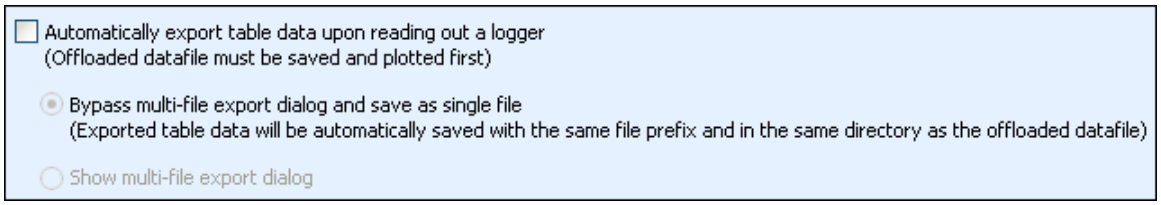
- Data delivery will not run unless device communication is also running. This means if you opt to stop device communication when you close HOBOnode Manager, then data delivery will also stop. Once you restart the device communication, then data delivery will commence again on the previously configured schedule.
- The preferences for data delivery may include the names of settings files from old network deployments. If you enable data delivery and use the saved settings from an old deployment, you will see a message indicating "No data found for selected sensors." Choose a settings file from the current deployment, or create a new one with Plot/Export Wireless Data.

Important: Data Delivery will not work properly if the "Show multi-file export dialog" setting is selected in the export preferences. To disable this setting, select Preferences from the File menu in Windows or the HOBOware

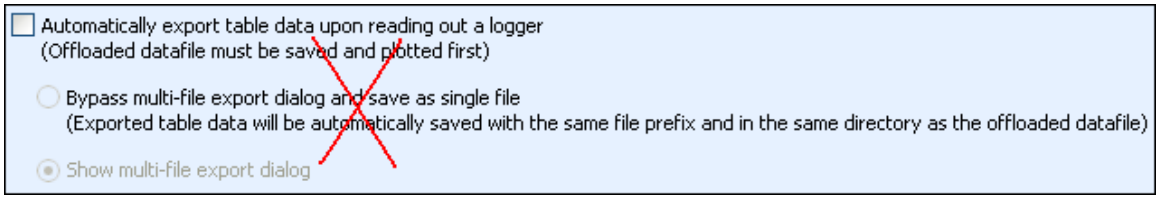
menu in Macintosh. In the General category, select Export Settings. Make sure "Show multi-file export dialog" is not selected. Even if the "Automatically export table data upon readout of logger" option is disabled, the "Show multi-file export" dialog must not be selected for Data Delivery to work properly. Your preferences must look like this:


Automatically export table data upon reading out a logger
(Offloaded datafile must be saved and plotted first)
Bypass multi-file export dialog and save as single file
(Exported table data will be automatically saved with the same file prefix and in the same directory as the offloaded datafile)
Show multi-file export dialog

or this:


Automatically export table data upon reading out a logger
(Offloaded datafile must be saved and plotted first)
Bypass multi-file export dialog and save as single file
(Exported table data will be automatically saved with the same file prefix and in the same directory as the offloaded datafile)
Show multi-file export dialog

but not like this:


Automatically export table data upon reading out a logger
(Offloaded datafile must be saved and plotted first)
Bypass multi-file export dialog and save as single file
(Exported table data will be automatically saved with the same file prefix and in the same directory as the offloaded datafile)
Show multi-file export dialog

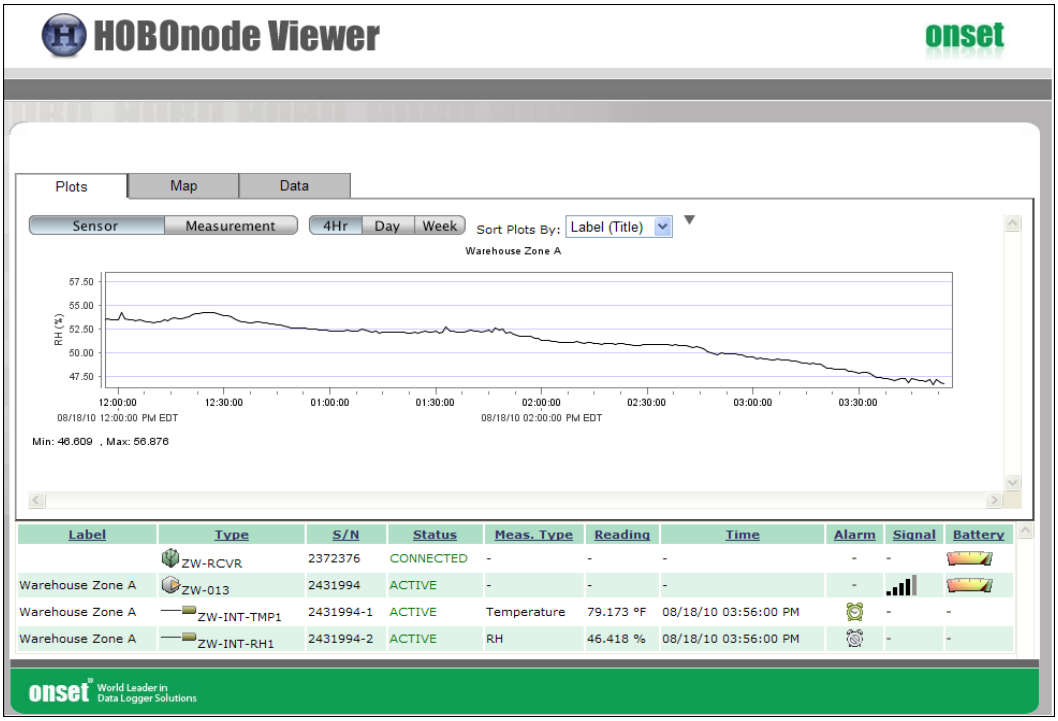
for Data Delivery to work correctly.

Tip: You can also share data from your HOBO data node network by enabling a HOBOnode Viewer webpage. When data delivery is configured to save files to your computer or a network drive, the files will also be available on the Data tab in HOBOnode Viewer. Note that if you change the file directory used for data delivery when HOBOnode Viewer is enabled, you will need to restart HOBOnode Manager before you can access the files from the Data tab.

Using HOBOnode Viewer

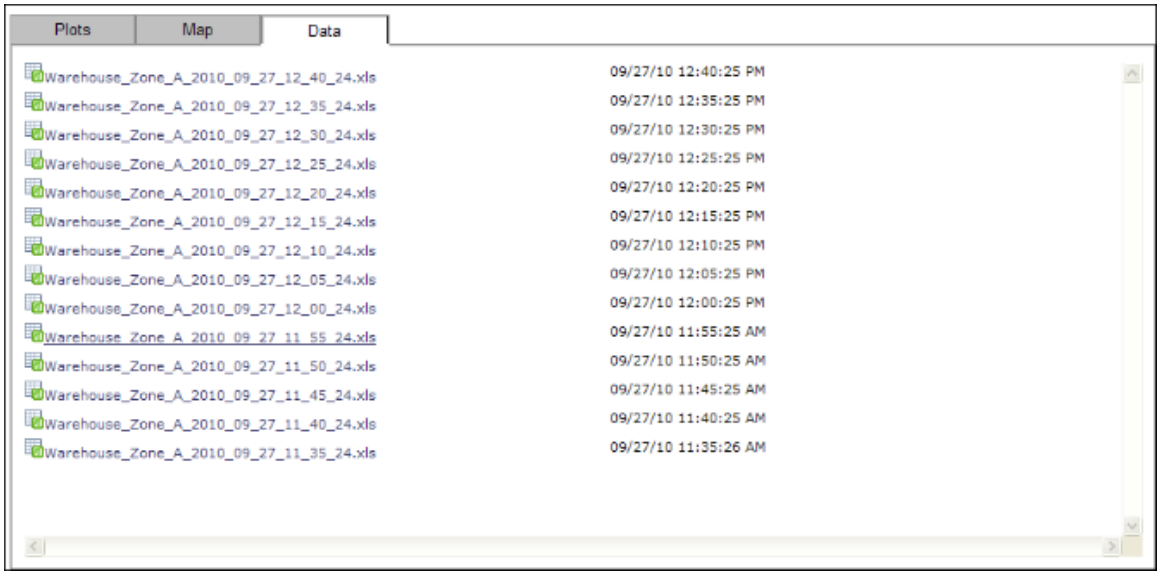
Many of the elements in HOBOnode Viewer are the same as HOBOnode Manager. Specifically, you can do the following with HOBOnode Viewer just as you would with HOBOnode Manager:

- Organize plots by sensor or by measurement type
- View plot data hourly, by day, by week, or by month (the month view must be enabled in the preferences for real-time plots)
- Sort the plots several ways, including by serial number, current reading, and alarm state
- View a map of your network devices
- Check the device table for details on each device in your network
- Change the device table view by sorting the columns



There are, however, some key differences between HOBOnode Manager and HOBOnode Viewer.

- HOBOnode Viewer, as its name implies, is a viewer only. Any changes you wish to make to your network, including updates to alarms or modifications to the map, need to be done directly in HOBOnode Manager.
- With HOBOnode Manager, you can see all available sensor channels on all devices, including those without a sensor type selected. HOBOnode Viewer displays enabled sensor channels only. If a device in HOBOnode Manager has a channel listed as "OFF," then that channel will not appear in HOBOnode viewer.
- There may be some minor differences in plot appearance if you are comparing the plots in HOBOnode Viewer to HOBOnode Manager. In general, plots are nearly identical, but there could be slight differences in scaling.
- If you set up data delivery and chose to have files saved to yourcomputer or a network drive, then a Data tab will be visible in HOBOnode Viewer with a list of all files delivered through that service as shown below. Click a file name to open or save the file.



Note: If you change the file directory location in the data delivery settings, then you must restart HOBOnode Manager before you can access the files from the Data tab in HOBOnode Viewer.

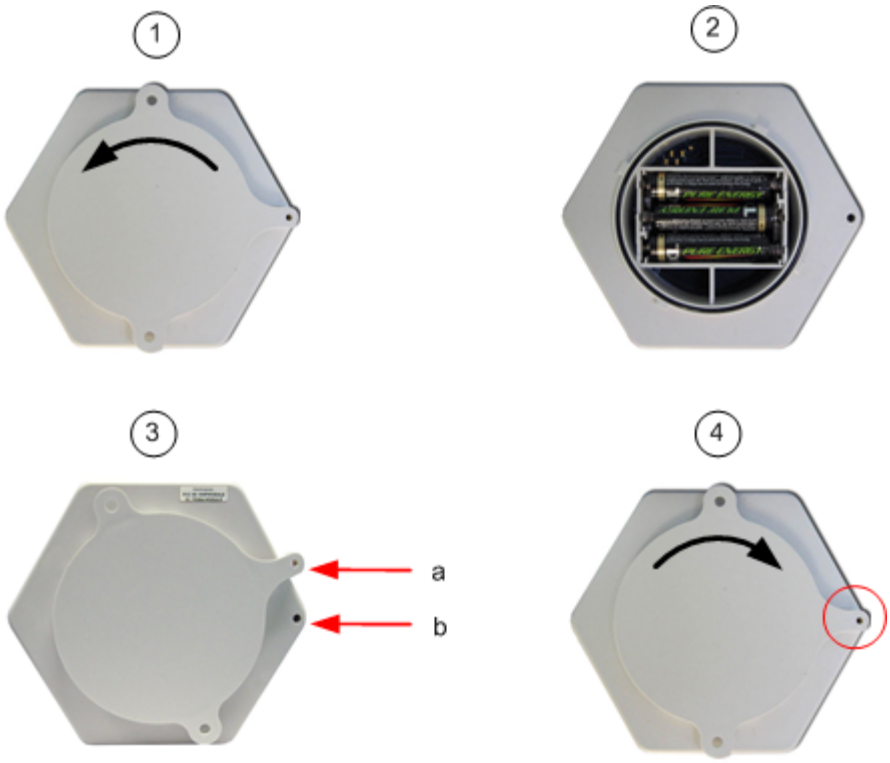
Any changes you make to your network with HOBOnode Manager will be reflected in the HOBOnode Viewer upon the next refresh, or update. HOBOnode Viewer refreshes every 30 seconds. You can also use your browser's refresh feature if you want to see a change immediately.

Important: HOBOnode Viewer is only available while HOBOnode Manager is running. If you close HOBOnode Manager and then attempt to access HOBOnode Viewer, the web page will not open. Always keep HOBOnode Manager running to ensure anyone accessing HOBOnode Viewer can see the real-time plots and data.

Maintenance

Installing Batteries

1. Twist the battery cover on the back of the data node counterclockwise to remove.
2. Insert 3 AAA batteries.
3. Replace the cover, aligning the threaded hole on the cover (a) just above the hole on the case (b).
4. Twist cover clockwise to secure. The mounting holes should be at the top and bottom of the case and the threaded screw hole should be aligned with the hole in the case.



Moving or Removing a Data Node

Deactivating a Data Node

If you will not be using a data node for an extended period of time you may want to deactivate it to stop measurements and save batteries.

To deactivate a data node, use a paper clip to press the **Activate** button for 5 seconds until the red LED starts flashing.

To later reactivate the data node, select Form Network from HOBOnode Manager and briefly depress the **Activate** button on the node.

Removing a Data Node from HOBOnode Manager

If you do not want a data node to appear in HOBOnode Manager, double-click the device row in the Device Table and then click **Remove Node** in the Configure Node window.

Moving a Node

If you move a data node to a new location, make sure the green LED is still blinking once per 10 seconds to indicate that the node still has a connection to the receiver. If the red LED is blinking, indicating that the connection path is broken, try adjusting the orientation of the data node or moving it closer to the receiver to minimize obstructions. You may need to add a ZW-ROUTER to re-establish a connection.

Switching from AC Power to Battery Power

If you initially power up a node using AC power, but then cannot provide AC power at deployment, you must follow this procedure.

1. Deactivate the data node by pressing the activation button for 5 seconds until the red LED starts flashing repeatedly.
2. Disconnect the data node from AC power.
3. If batteries are installed, remove them.
4. Wait at least 30 seconds to clear the memory.
5. Re-install the batteries.
6. Click **Form Network** in HOBOnode Manager.
7. Reactivate the data node by briefly tapping the **Activate** button.
8. Verify that the data node appears in the HOBOnode Manager table and is identified as a Node (no routing capabilities). See Determining Data Node Type on page 197.

Switching from Battery Power to AC Power

If you initially powered a data node using batteries, but are switching it to AC Power, you must perform the following steps so that HOBOnode Manager recognizes the data node as having routing capabilities.

1. Deactivate the data node by pressing the activation button for 5 seconds until the red LED starts flashing repeatedly.
2. Remove the batteries from the data node.
3. Wait at least 30 seconds to clear the memory.
4. Plug the data node into an AC power outlet.
5. Re-install the batteries.
6. Click **Form Network** in HOBOnode Manager.
7. Reactivate the data node by briefly tapping the Activate button.
8. Verify that the data node appears in the HOBOnode Manager table and is identified as a router. See Determining Data Node Type on page 197.

Changing Logging and Connection Intervals

There are two types of intervals associated with data nodes:

- the logging interval, which is how often the node records data; and
- the connection interval, which is how often the node transmits data to the receiver.

When a data node joins a network, it uses the default logging and connection intervals that are set within the general preferences (upon installation of the software, the default logging interval is 1 minute and the default connection interval is 10 minutes). However, you can also define logging and connection intervals on a per-node basis, which gives you the flexibility of having data nodes logging and transmitting data at different rates.

Changing Default Values in Preferences

To change the default logging and connection intervals, click the **Actions** button in HOBOnode Manager and select **Edit HOBO Data Node Preferences**. Or, within HOBOware, select **File** > **Preferences** on Windows or **HOBOware >**

Preferences on Macintosh and click **Data Nodes**. The default logging and connection intervals are under the General category of the data node preferences.

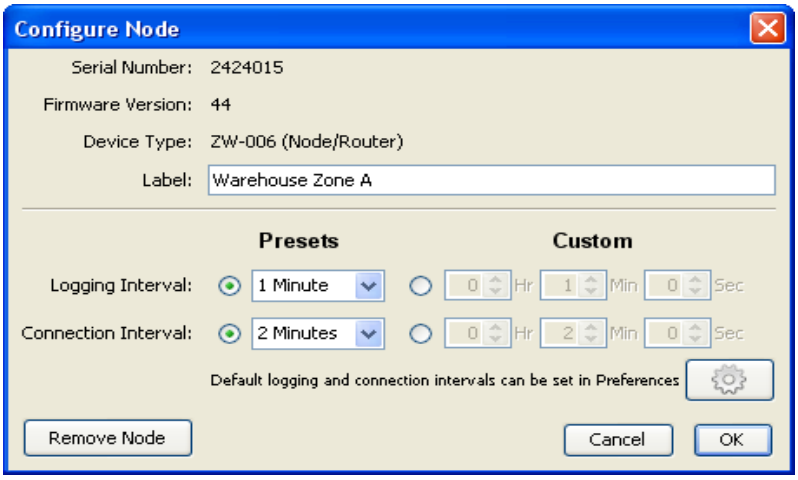
Select a preset value or set a custom interval. The minimum logging interval is 1 minute, and the minimum connection interval is 2 minutes.

These default values will only be used for new data nodes that join the network. Changes to these default intervals will not affect data nodes that are already logging or that have been previously configured with their own individual logging or connection interval.

Changing Intervals for Individual Data Nodes

To change the logging and connection intervals on an individual data node:

1. Double-click the data node entry in the Device Table to open the Configure Device window.


Configure Node
Serial Number: 2424015
Firmware Version: 44
Device Type: ZW-006 (Node/Router)
Label: Warehouse Zone A
Presets
Custom
Logging Interval: 1 Minute 0 Hr 1 Min 0 Sec
Connection Interval: 2 Minutes 0 Hr 2 Min 0 Sec
Default logging and connection intervals can be set in Preferences
Remove Node
Cancel
OK

2. Change the logging interval and connection interval as required.
3. Click **OK**.

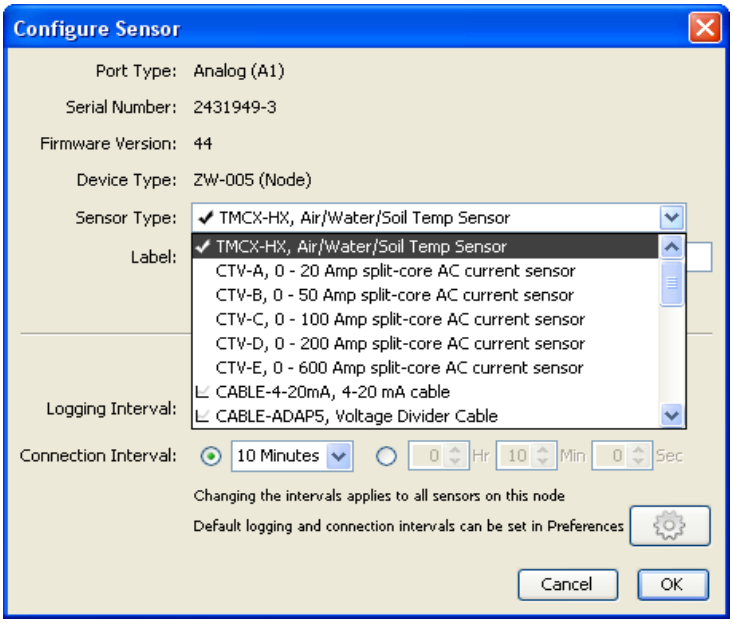
The changes will take effect the next time the data node connects to the receiver; they will only apply to that particular data node and its sensors. All other data nodes in the network will continue logging and connecting at their current intervals.

Changing External Sensor Type

Many types of HOBO data nodes can be configured with external sensors. One of the benefits of using external sensors is that you can swap them out when necessary for different ones if you want to modify your wireless network. Or, you can disable the external sensor channel if you don't need it for your current network deployment.

To change the type of external sensor associated with a data node:

1. Double-click the external sensor you wish to change in the HOBOnode Manager device table.
2. Select the sensor from the Sensor Type drop-down list.

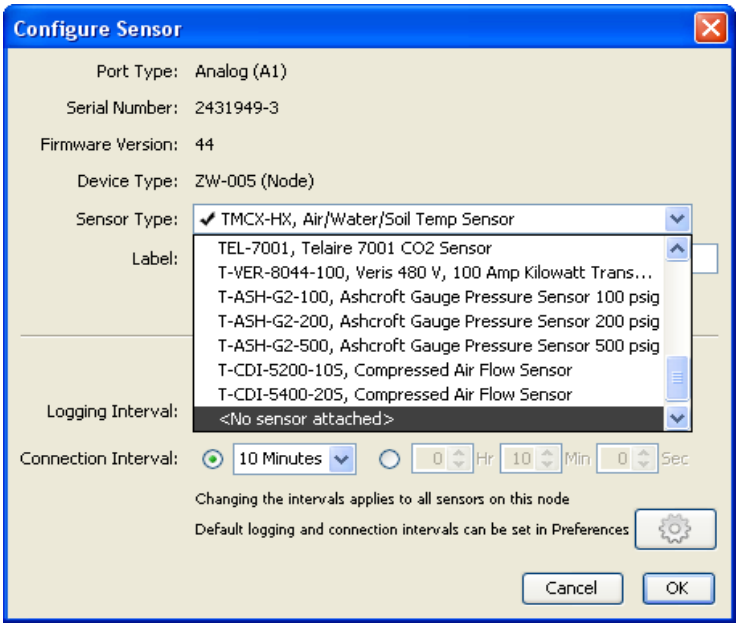

Configure Sensor
Port Type: Analog (A1)
Serial Number: 2431949-3
Firmware Version: 44
Device Type: ZW-005 (Node)
Sensor Type: TMCX-HX, Air/Water/Soil Temp Sensor
Label:
TMCX-HX, Air/Water/Soil Temp Sensor
CTV-A, 0 - 20 Amp split-core AC current sensor
CTV-B, 0 - 50 Amp split-core AC current sensor
CTV-C, 0 - 100 Amp split-core AC current sensor
CTV-D, 0 - 200 Amp split-core AC current sensor
CTV-E, 0 - 600 Amp split-core AC current sensor
CABLE-4-20mA, 4-20 mA cable
CABLE-ADAP5, Voltage Divider Cable
Logging Interval:
Connection Interval: 10 Minutes
Hr Min Sec
Changing the intervals applies to all sensors on this node
Default logging and connection intervals can be set in Preferences
Cancel
OK

3. Make any other changes as necessary and click OK.

Note: While the HOBOnode Manager device table will display the change to the sensor type immediately, data for the new sensor will not display until the next connection interval .

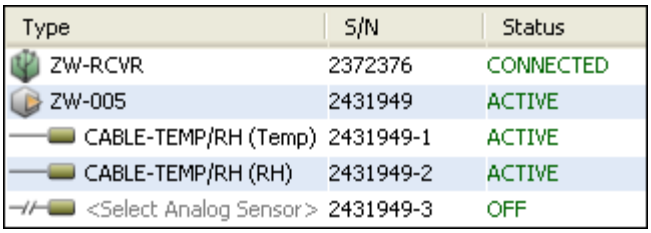
To deselect, or turn off, an external sensor:

1. Double-click the external sensor you wish to change in the HOBOnode Manager device table.
2. Scroll to the end of the Sensor Type drop-down list and select <No sensor attached>.


Configure Sensor
Port Type: Analog (A1)
Serial Number: 2431949-3
Firmware Version: 44
Device Type: ZW-005 (Node)
Sensor Type: TMCX-HX, Air/Water/Soil Temp Sensor
Label:
TEL-7001, Telaire 7001 CO2 Sensor
T-VER-8044-100, Veris 480 V, 100 Amp Kilowatt Trans...
T-ASH-G2-100, Ashcroft Gauge Pressure Sensor 100 psig
T-ASH-G2-200, Ashcroft Gauge Pressure Sensor 200 psig
T-ASH-G2-500, Ashcroft Gauge Pressure Sensor 500 psig
T-CDI-5200-10S, Compressed Air Flow Sensor
T-CDI-5400-20S, Compressed Air Flow Sensor
<No sensor attached>
Logging Interval:
Connection Interval: 10 Minutes
Hr Min Sec
Changing the intervals applies to all sensors on this node
Default logging and connection intervals can be set in Preferences
Cancel
OK

3. Make any other changes as necessary and click OK.

The HOBOnode Manager device table will then change the status for that external sensor to OFF as shown below. Any plots and alarms associated with that sensor will also be removed from HOBOnode Manager.

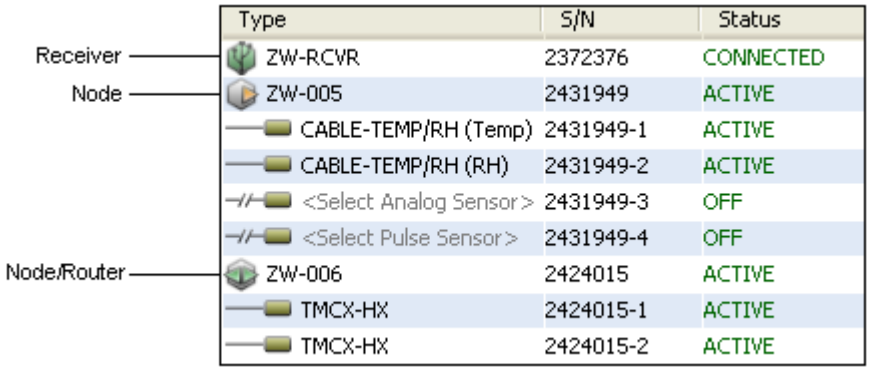


Shortcut: In the device table, click the checkbox next to the external sensor, then click the Sensor Type button and select the sensor from the list. This can be done for many sensors at once by selecting more than one sensor at a time in the device table.

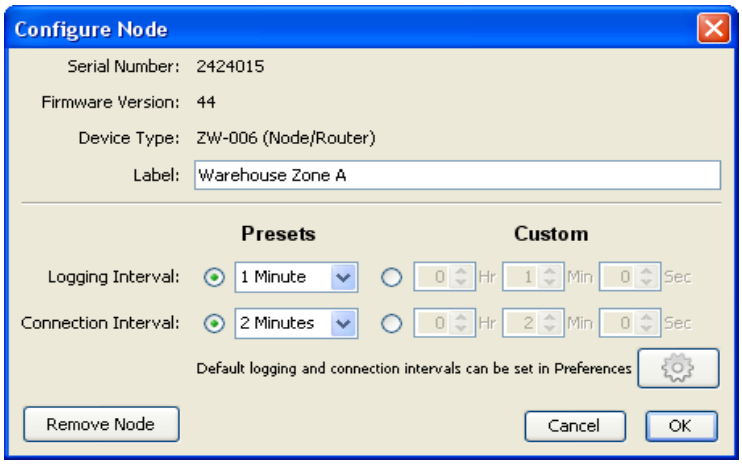
For details on setting up a HOBO data node with an external sensor for the first time, see Selecting External Sensor Type.

Determining Data Node Type

There are four types of devices displayed within HOBOnode Manager: data receiver, data node, data node/router, and router. Use the icons in the device table to identify data node types. This is particularly helpful if you need to verify whether a device is acting as a data node only or if it also has routing abilities (a data node can only function as a router when it is plugged into an outlet with an AC adapter).



For another way to see whether the device is a data node only or a data node/router, double-click the device to open the Configure Node dialog. Check the Device Type for the device part number and description. In the example below, the device is operating as a both a data node and a router so the Device Type is listed as "ZW-006 (Node/Router)." If this device was powered by batteries only, then it would be operating as a data node and not a router, and listed as "ZW-006 (Node)."



Database Backup and Restore

Onset recommends that you periodically back up your database to secure your data in case of a database failure. You can back up your database to an external hard drive or network server using third-party backup software.

If you should ever need to restore your database, simply replace the primary database with the backup.

The database is stored at the following location:

- Windows 7.0 and Vista

c:\Users\<user name>\AppData\Local\OnsetComputerCorporation\cosmos\db

- Windows XP

c:\Documents and Settings\<user name>\Application Data\Local\OnsetComputerCorporation\cosmos\db

- Mac OS 10.5 and 10.6

/Users/<user name>/Documents/OnsetComputerCorporation/cosmos/db

To rename the database, modify the name of the db folder by adding the deployment location or the date (example: "db-11-10"). **Note:** HOBOnode Manager will be empty after renaming the database. You will need to form a new network.

Creating a New Deployment

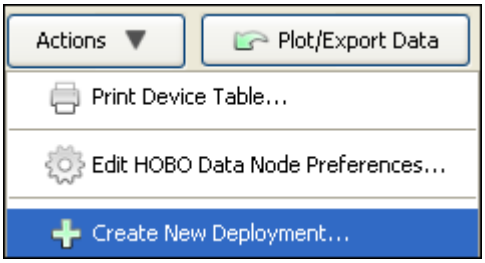
The first time you form a HOBO data node wireless network, the initial deployment, or network configuration, is created automatically for you. This first deployment can continue indefinitely. However, you also have the option to create a new deployment if you need to move your current network to a new location or if you'd like to configure a different set of sensors in a new network, for example. This allows you to more easily distinguish between two separate networks or deployments of nodes when they are plotted or exported from HOBOware.

You have the option of either creating a new deployment that is an exact copy of the previous one (all devices, alarms, and settings will be copied as currently configured) or consists of a new network (only system alarms and alarm logs are copied).

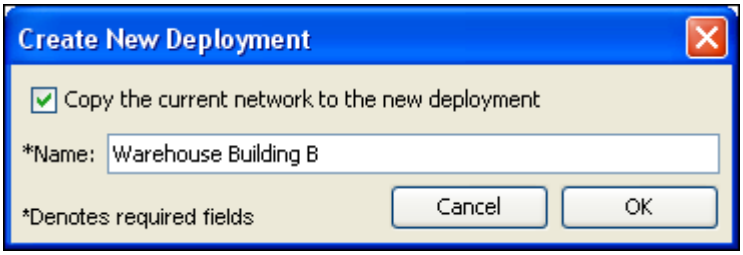
Note: Creating a new deployment does not create a new database. All data recorded in the previous deployment is saved and can be accessed through Plot/Export Data.

To create a new deployment:

1. Click the Actions button in HOBOnode Manager and select **Create New Deployment**.

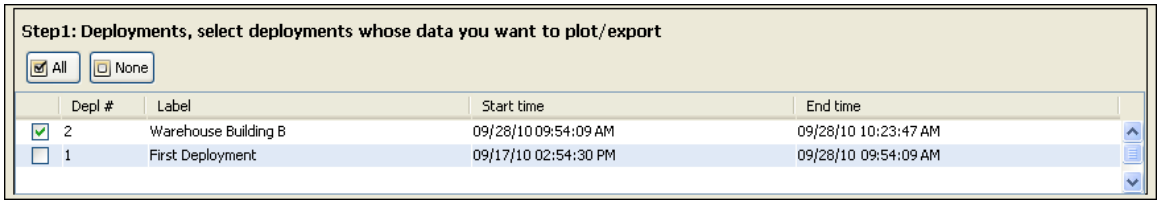


2. Type a name for the new deployment. Select the **Copy the current network to the new deployment** checkbox if you want to use the current deployment as the basis for the new deployment (HOBOnode Manager will automatically be filled in with your current network devices, alarms, and settings). If you do not copy the current network, then you will need to form a new network (only system alarms and alarm logs will appear in HOBOnode Manager). Click **OK**.



3. A message appears indicating that the current network deployment will end and a new deployment will be started. Click **Yes** to continue, or click **No** to return to the Create New Deployment dialog.
4. From the **Device** menu in HOBOware, select **Manage HOBO Data Node Network** to restart HOBOnode Manager.
5. If you chose to copy the current network to the new deployment, then HOBOnode Manager opens with all devices listed. Plots will begin displaying the new network data at the next scheduled connection interval. If you did not copy the old network, then you will be prompted to form a new network.

Both the newly created deployment and the previous deployment are listed in the Plot/Export Wireless Data window. Click the **Plot/Export** button in HOBOnode Manager to see the deployment list as shown in the example below.



Deployments are listed from newest to oldest. The initial deployment is labeled "First Deployment" by default. Any subsequent deployments are listed with the name you entered in the Create New Deployment dialog.

The start time for the current deployment (the deployment at the top of the list) is the time the new deployment was created, which is also the end time for the previous deployment on the list.The end time for the current deployment is the current time.

Reference

Troubleshooting

General Network Connection Issues

If you are having problems connecting data nodes to the receiver, or they are losing a connection after they have been joined to the network, you may be experiencing issues with a conflicting wireless device. To reset the radio channel, double-click the receiver row in the Device Table and in the Configure Receiver window click the **Reset** button.

Receiver Will Not Connect to HOBOnode Manager

Make sure the USB plug is secure on both ends. Try unplugging and plugging the receiver back in.

Data Node Cannot Join Network

Positioning: If you are having trouble getting a data node to join the network, try repositioning the node within the space. Move the data node away from any obstacles (such as metal walls, stairwells, elevator shafts) that may exist between it and the receiver.

Distance: The data node may be too far from the receiver to obtain a signal. Try moving the data node closer to the receiver, or add a router or router/node between the data node and the receiver.

Make sure the receiver is in Form Network mode (RED and GREEN LEDs alternating)

Make sure you have pressed the button on the bottom of the node and that the RED and GREEN LEDs are alternating. Try pressing the button again.

Debugging

There are a number of debugging and logging options in HOBOnode Manager. If you are working with Onset Technical Support on an issue, you may be asked to enable debugging options and send a log file to Onset.

No readings for a sensor

For external sensors, make sure the connection to the data node is secure and that you have assigned a Sensor Type (does not apply to the External Temp/RH Sensor).

No Plot Appears for a Sensor

Make sure you have checked the Plot box in the Device Table for the sensor.

Extreme Sensor Readings

If you are seeing extreme sensor readings, make sure that the sensor cable is securely plugged into the node.

Alarms

If an alarm you configured is not appearing in the Alarms window, make sure the filter is set to Show all.

Security Connection Messages on Macintosh

If the firewall setting is enabled in the security system preferences on a Macintosh, you may encounter a security warning message every time you open HOBOnode Manager. To turn off this message, go to System Preferences, select Security, and turn off the firewall. **Note:** Keeping the firewall turned on and adjusting the advanced settings to allow all incoming connections for HOBOware does not resolve the problem.

Firewall Messages on Windows

Windows Firewall must allow access to HOBOware.exe for HOBOnode Viewer to run properly. To allow HOBOware access, open Control Panel, go to Security, and select Allow a program through Windows Firewall (or click Windows Firewall and click the Exceptions tab on some versions of Windows). Make sure HOBOware is selected in the allowed access/exceptions list.

Changing Locale

The language in use at the time the original HOBO data node network database was created is the only language that can be used for that database. You cannot switch to another language. If you need to change the locale on the computer that contains your HOBO data node network database, you will need to:

1. Back up and then move or rename the database.
2. Change the locale on the computer.
3. Form a new network to create a database that operates in the new locale.

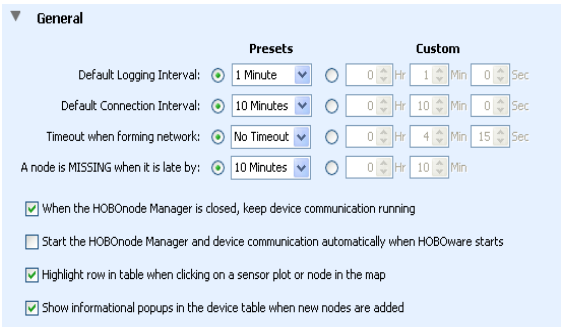
HOBOnode Manager General Preferences

Use the HOBOnode Manager General Preferences to change the default behavior of HOBOnode Manager.

You can access the HOBOnode Manager Preferences the following ways:

- In HOBOware, select **File > Preferences** on Windows or **HOBOware > Preferences** on Macintosh and click **Data Nodes**.

- At the bottom of the HOBOnode Manager window, click the Actions button and select Edit HOBO Data Node Preferences.


General
Presets
Custom
Default Logging Interval:
1 Minute
Default Connection Interval:
10 Minutes
Timeout when forming network:
No Timeout
A node is MISSING when it is late by:
10 Minutes
When the HOBOnode Manager is closed, keep device communication running
Start the HOBOnode Manager and device communication automatically when HOBOware starts
Highlight row in table when clicking on a sensor plot or node in the map
Show informational popups in the device table when new nodes are added

- Default Logging Interval - This is how often data nodes will log data.
- Default Connection Interval - This is how often data nodes will send data to the Device Communication component, which will send the data to the receiver.
- Timeout When Forming Network - This is the amount of time that you can add a data node to the network after you click the Form Network button. By default, Form Network mode will remain active until you click the X on the Form Network progress indicator.
- A node is MISSING when it is late by - This is how long a node must go without sending data to HOBOnode Manager for it to be marked as missing. When a data node is missing its status in the Device Table will be MISSING, and a MISSING NODE alarm will be tripped (if configured).

Enable/Disable

Check or uncheck the boxes to enable or disable the action.

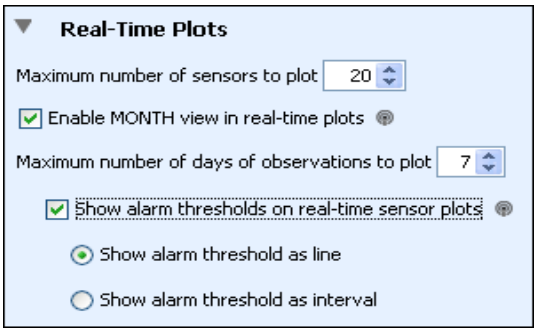
- When the HOBOnode Manager is closed, keep device communication running
- Start the HOBOnode Manager and device communication automatically when HOBOware starts.
- Highlight row in table when clicking on a sensor or data node in the map.
- Show informational popups in the device table when new nodes are added.

Setting Preferences for Real-Time Plots

You can customize the plots that appear in HOBOnode Manager by increasing the number of sensors you can plot at one time, adding the ability to view monthly data, displaying alarm thresholds, and more.

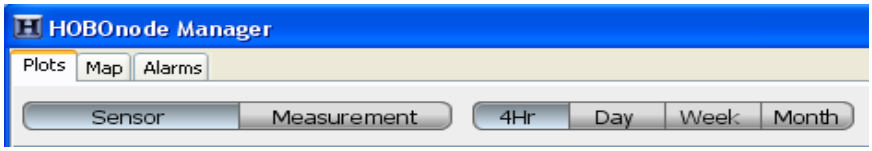
To access the preferences for real-time plots within HOBOnode Manager, click the **Actions** button and select **Edit HOBO Data Node Preferences**. To access them from HOBOware, select **File** > **Preferences** on Windows or **HOBOware > Preferences** on Macintosh and click **Data Nodes**.

These preferences are specific to real-time plots only. See Plotting Preferences for details on how to change general plot appearance, such as changing font type and size, adding gridlines, or modifying axis details.


Real-Time Plots
Maximum number of sensors to plot
20
Enable MONTH view in real-time plots
Maximum number of days of observations to plot
7
Show alarm thresholds on real-time sensor plots
Show alarm threshold as line
Show alarm threshold as interval

Maximum number of sensors to plot: Select how many data node sensors you want to be able to plot at one time within HOBOnode Manager. You can select from 1 sensor to 100, with a default of 20.

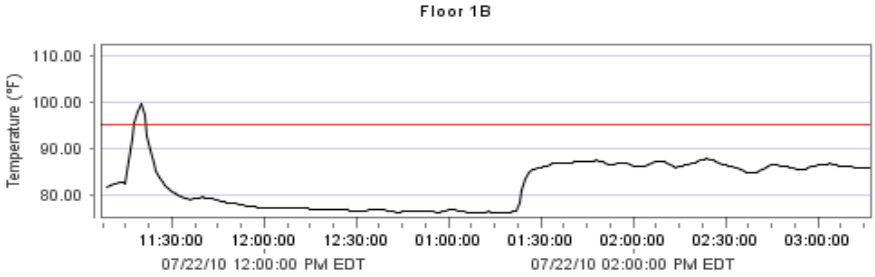
Enable MONTH view in real-time plots: Select this checkbox to add a Month button to the Plots tab in HOBOnode Manager. You can then plot data by hour (4 hours), day, week, or month. The Month view is disabled by default.



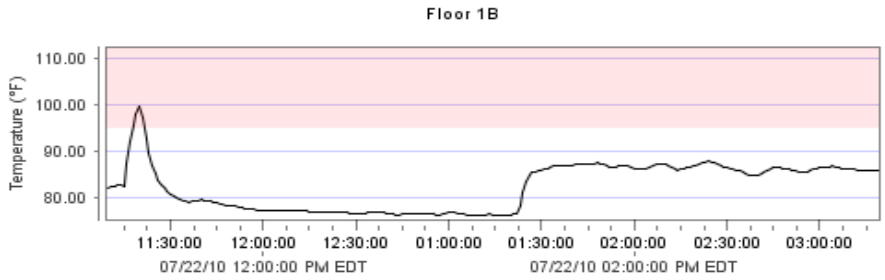
Maximum number of days of observations to plot: Select how many days worth of data you want to view in the plot, up to 31. The default is 7 days.

Show alarm thresholds on real-time sensor plots: Select this checkbox to add a visual indicator, or reference point, when a sensor alarm has tripped.

- Select **Show alarm threshold as line** to display the alarm threshold on the real time plots as a horizontal line. An example of this type of reference point is the red line in the following plot where an alarm was configured to trip at above 95 degrees Fahrenheit.

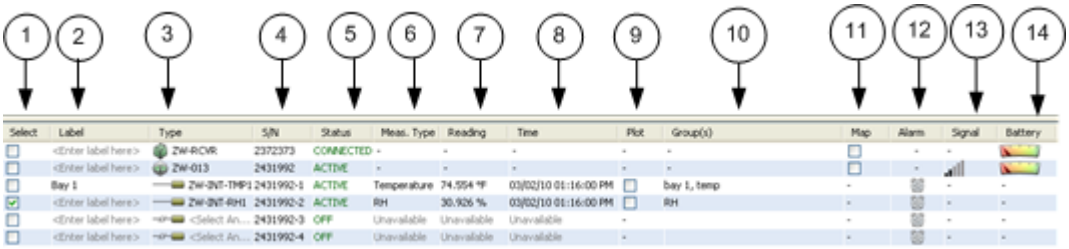


- Select **Show alarm threshold as interval** to display the alarm threshold as a shaded area: red when the alarm is above the specified threshold and blue when it is below. Using the same example, there is a red shaded area from above 95 degrees on the following plot instead of a single red line.



The Device Table

This topic describes the columns in the Device Table, located at the bottom of the HOBOnode Manager window.



1. Select - Select devices you want to apply an action to. After you select a device or devices, click Action and select the desired action, such as assigning groups, or configuration.
2. Label - This is a name you assign to a node or sensor. To enter a label, double-click the cell and type in the label.
3. Type - This column is automatically populated with the device type.
4. S/N - The Serial Number of the device.
5. Status - This column indicates the status of the device.

   Active - Device is communicating with the receiver.

   Missing - Node has not reported to the receiver within the Missing threshold.

6. Meas. Type - The Measurement Type of the sensor.
7. Reading - The latest reading from the sensor.
8. Time - The time the latest reading was taken.
9. Plot - Check the box for the device to have the device readings appear in the real-time plots.
10. Group(s) - The group(s) you have assigned this sensor too.
11. Map - Check the box for the device to place the device on the Network Map. Drag the icon the desired location on the map and click the mouse button.
12. Alarms - Icons appear in the Alarms column indicating the alarm status for the device.
13. Signal - Indicates the signal strength for the device.
14. Battery - Strength

LEDs

LED Pattern > Indication

Refer to this table to interpret an LED pattern on a device.

LED Pattern	Indication
Green blinks every 5 seconds	Data node is on the network
Red blinks every 5 seconds	Data node is off the network
Alternating **Red** and **Green**	Device is in Form Network mode or is joining the network
Alternating **Red** and **Green** twice, then blink **Red** continuously	Data node cannot find network
Alternate **Red** and **Green** for 2 minutes, then blink **Red** continuously	Data node could not join network because the receiver is out of range, or there is interference.
Green blinks rapidly 10 times, then **Red** blinks rapidly 10 times, then both stay OFF.	You pressed the button to add the data node to the network, but the node did not enter Join Network mode. Try pressing the button again.
RED and GREEN blink simultaneously for 5 seconds, then RED for 5 seconds, then both blink once, then both go OFF	Powering a data node using a wall outlet. NOTE: If you unplug the node and then plug it back in within 30 seconds, there will be no LED indication.
GREEN blinks for 5 seconds, then RED blinks for 5 seconds, then both go OFF	Powering a data node using batteries only
Random	Dead Battery
Red and **Green** at the same time twice	Transmitting Data

Action > LED Pattern

Use this table to verify actions that you are performing.

Action	LED Pattern
Powering a data node using a wall outlet	**Red** and **Green** simultaneously for 5 seconds, then **Red** for 5 seconds, then **Green** once, then OFF
Powering a data node using batteries only	**Green** for 5 seconds, then **Red** for 5 seconds, then OFF
Forming a network	Receiver: Alternating **Red** and **Green** continuously Router or Router/Node: Alternating **Red** and **Green** continuously, then blink **Green** twice, then resume alternating. Node: Alternating **Red** and **Green** continuously, then **Green** every 5 seconds.
Removing a data node from the network	**Red** 10 times, then **Red** and **Green** on for several seconds, then off

Device Status

Use this table to determine what status a device is in.

Status	LED Pattern
Data node is ACTIVE	**Green** every 5 seconds
Data node is off the network	**Red** every 5 seconds
Data node is transmitting data	**Red** and **Green** twice simultaneously
Data node is in Form Network mode	Alternating **Red** and **Green** continuously

Chapter 7: Reference

Refer to the following for details on HOBOware interface components:

- Windows
- Menus
- Toolbar
- Preferences

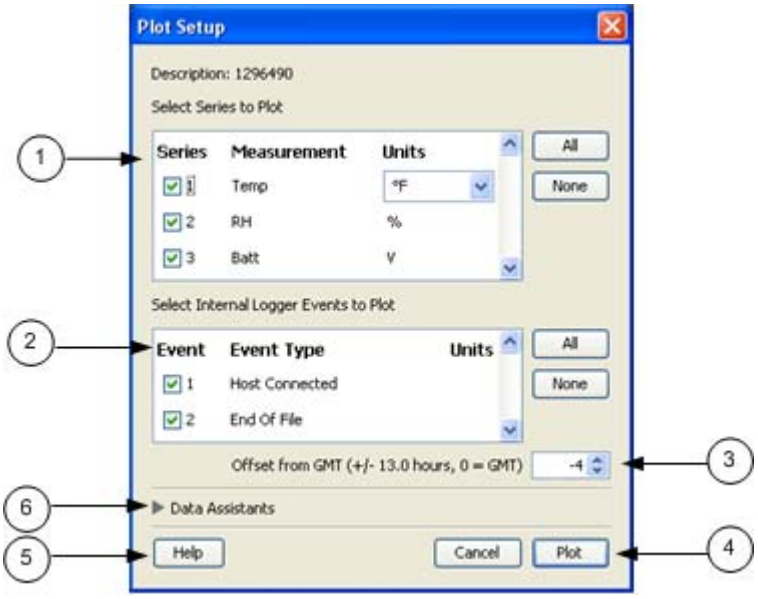
Windows

Refer to the following for details on some of the windows in HOBOware:

- Plot Setup
- Merge Series
- Filter Series
- Select Channel to Configure

The Plot Setup Window

After you read out a logger or open a saved datafile, the **Plot Setup** window appears.



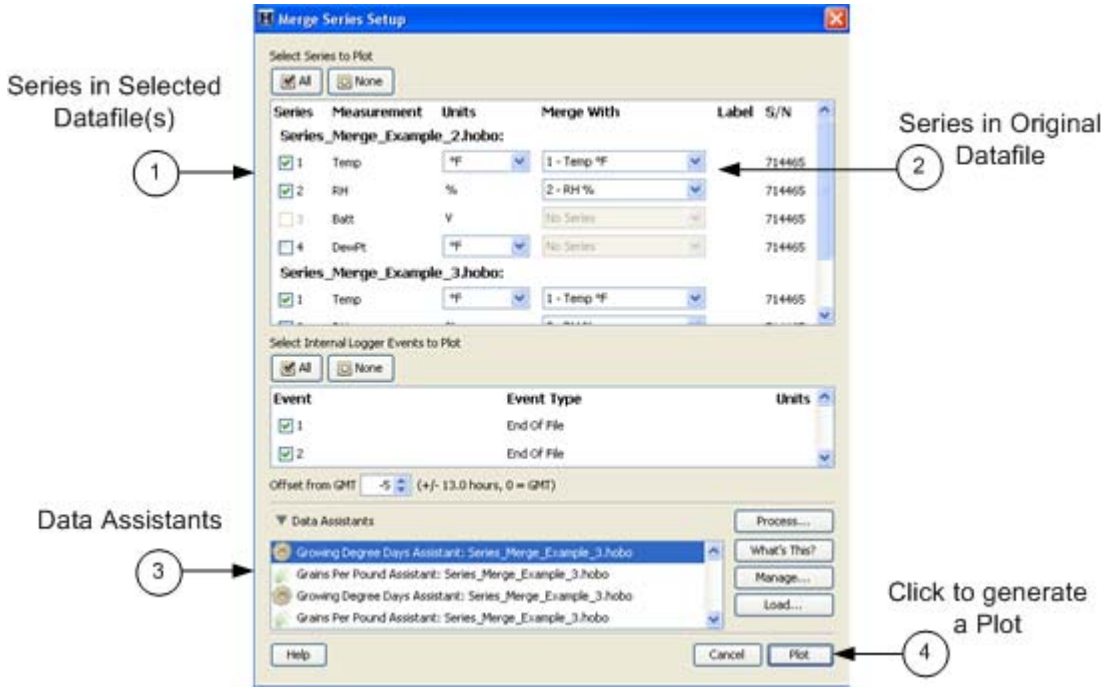
1. Select Series to Plot: Select the series you want to plot and the units, if applicable.
2. Select Internal Logger Events to Plot: Select internal logger events to plot (only available for some loggers).
3. Offset from GMT: Set the Time Zone Offset from GMT if required.
4. Plot Button: Click this button to plot the selected data on a graph.
5. Help: Click to launch the Help for the Plot Setup window.
6. Data Assistants (HOBOware Pro Only).

   HOBOware Pro Data Assistants let you create new data series by combining data recorded by the logger with additional data. See Data Assistants for more information.

NOTE: The following Data Assistant can also be run from the Launch window: Pulse Scaling, Linear Scaling, kWh.

Merge Series Setup Window

Use the Merge Series Setup window to combine multiple datafiles from a deployment into one file.



1. Series in Selected Datafile(s)

All series available in the selected datafiles appear on the left side of the Select Series to Plot section. Uncheck any series you do not want to include in the merge.

2. Merge With

All matching series available in the selected series will be populated in the Merge With section, to the right of the corresponding series. Each new series can only be merged with the series of the same measurement type.

If no matching series (of the same measurement type) is available in the plot, the Merge With list will show No Series. If a matching series is found, you can still append the series without merging by choosing No Series from the Merge With list. The series will be appended to the plot without being merged with any series.

3. Data Assistants

Any Data Assistants that have been used for a series will appear in the Data Assistants section, appended with the file name. If you click the **Process** button, the Data Assistant will process the file associated with it. The new series resulting from the Data Assistants will be appended to the channels panel.

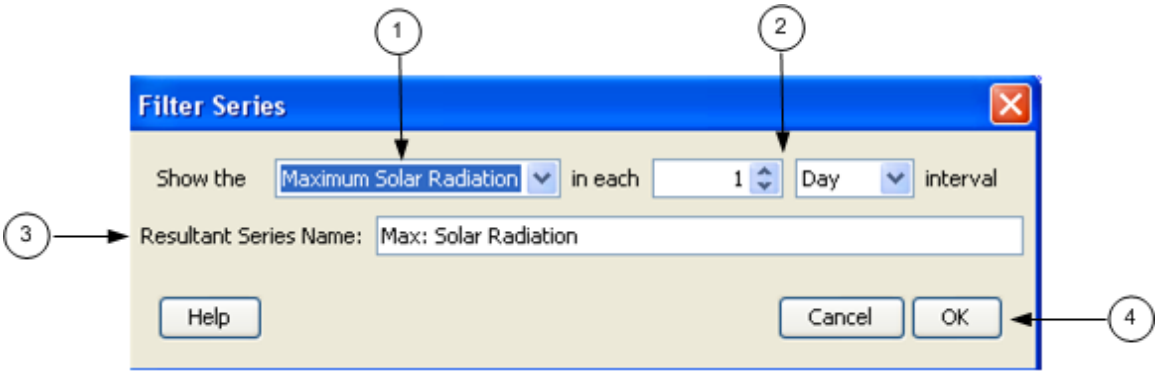
4. Plot button

Click the **Plot** button to merge selected series with their matching series. The new series unit will be converted to the matching series unit (if needed) before the merge.

The Filter Series Window

You can create a new series based on statistical analysis of an existing series over specified periods of time.

NOTE: When you apply a filter, the graph rescales to accommodate all of the displayed data.



1. Statistic Type

   Choose the type of statistic to use for the filter:

   For **sensor series**, you can create a series showing the minimum, maximum, or average over a period of time.

   For **external event series**, you can create a series showing a cumulative sum, or a count over a period of time.

   For **internal event series**, you can create a series showing a count over a period of time.

   For series created by Data Assistants, additional filters may be available (HOBOware Pro Only).

2. Interval

   Specify the interval over which you want these values to be calculated.

3. Resultant Series Name

   Enter a new Resultant Series Name, if desired.

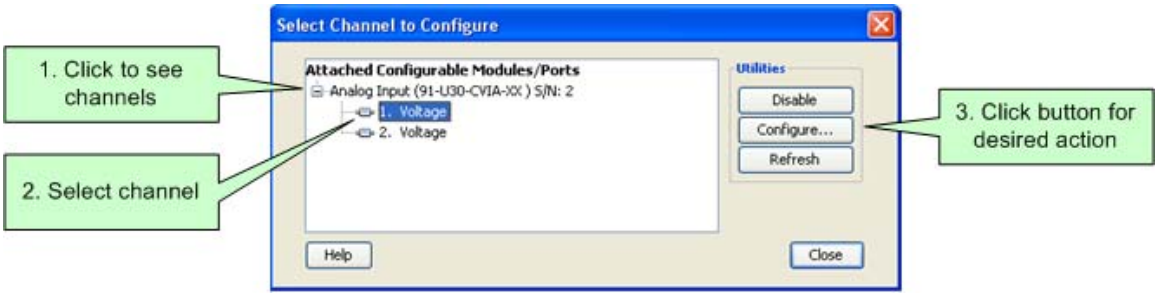
4. Click **OK**.

The new series is added to the graph, the Details pane, and the Points pane.

Select Channel to Configure Window

1. Click the plus sign next to the module/sensor name to see available channels.
2. Select the desired channel.
3. Click on the button for the action you want to perform: Disable, Configure, Refresh.

If you click **Configure**, the Configure Channel window appears.



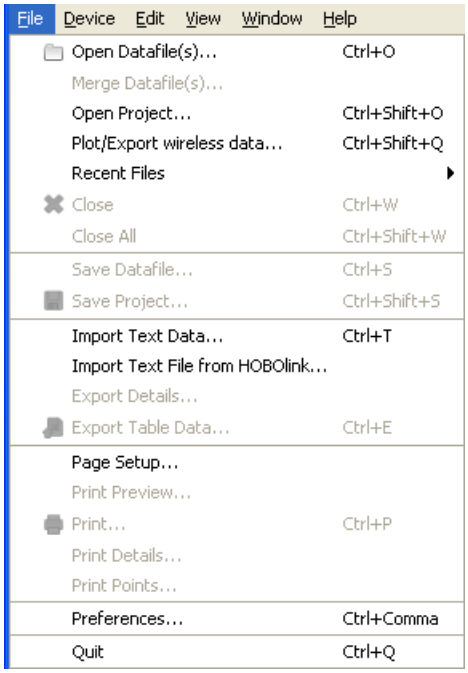
Menus

The following menus are available in HOBOware:

- File (called HOBOware on Macintosh)
- Device
- Edit
- View
- Window
- Help

The File Menu

From the File Menu, you can open datafiles and projects, import and export data, and print plot elements.

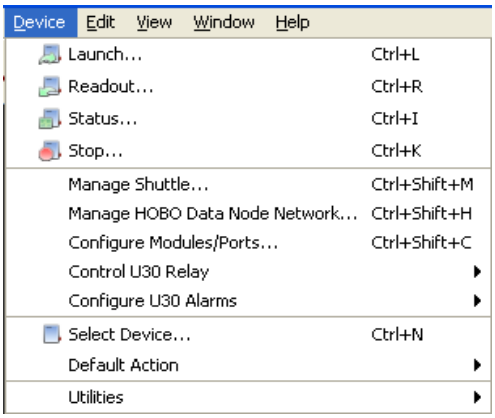


1. Open Datafile(s) - Select this option to open a compatible datafile. See Opening Files 54 for more information.
2. Merge Datafile(s) - Select this option to add a datafile to the end of another datafile.
3. Open Project - Select this option to open a HOBOware project. See Opening Files 54 for more information.
4. Plot/Export Wireless Data - This applies to a data node network and is only available in HOBOware Pro.

5. Recent Files - Select this option to quickly access the last 10 files you opened.
6. Close - Select this option to close the active file or project.
7. Close All - Select this option to close all open files and projects.
8. Save Datafile - Select this option to save the active datafile.
9. Save Project - Select this option to save the active project.
10. Import Text Data (HOBOware Pro Only) - Select this option to graph non-HOBOware data by importing data from certain text files. See Importing Text Files 93 for more information.
11. Import Text File from HOBOlink - Select this option to open a text file generated by HOBOlink for a HOBO U30 Station.
12. Export Details - Select this option to export the information in the Details Pane into a text file that can be opened in any text editor, or imported into many other types of programs (word processors, spreadsheets, etc.). See Exporting Details 100 for more information.
13. Export Table Data - Select this option to export the points shown in the Points table to a text file (.csv or .txt) for importing into Microsoft Excel and other applications. See Exporting Points as Excel Text for more information.
14. Page Setup - Select this option to set up your paper size, margins, and orientation for printing a graph.
15. Print Preview - Select this option to preview the page for printing a graph.
16. Print - Select this option to print a graph.
17. Print Details - Select this option to print the Details Pane.
18. Print Points - Select this option to print the Points Table.
19. Preferences - Select this option to access the **Preferences** window to change the default behavior of HOBOware. See Setting Preferences for more information. **Note:** Preferences is available from HOBOware menu on Macintosh.
20. Quit - Select this option to close HOBOware.

The Device Menu

This topic describes the options in the Device menu.

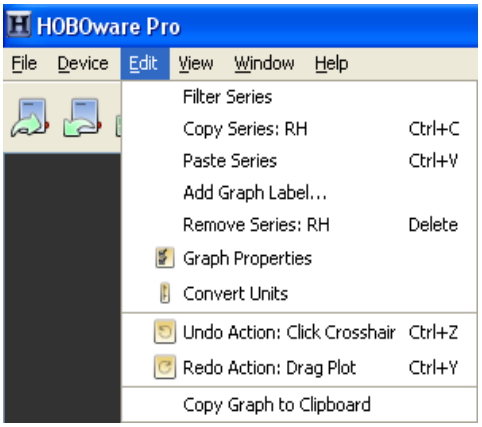


1. Launch - Select this option to access the Launch window to configure launch parameters and launch a logger.
2. Readout - Select this option to copy data from a logger to your computer, allowing you to save the data in a datafile and view the plot in HOBOware.
3. Status - Select this option to view real-time information about the attached logger, including: state of the logger, time logging will begin, current readings, logger memory used.
4. Stop - Select this option to stop a device.
5. Manage Shuttle (HOBOware Pro Only) - Select this option to manage a HOBO shuttle. See Working with a Shuttle 116 for more information.

6. Manage HOBO Data Node Network (HOBOware Pro Only) - Select this option to open the HOBOnode Manager.
7. Configure Modules/Ports (HOBOware Pro Only) - Select this option to configure analog sensor ports or Flexsmart modules.
8. Control U30 Relay - Select this option to configure the default state of a relay on a HOBO U30, or to activate or deactivate the relay for testing. See Controlling the Relay on the HOBO U30 Station 105 for more information.
9. Configure U30 Alarms - Select this option to set up alarms on the HOBO U30 Station.
10. Select Device - Select this option to select a device that is connected to the computer.
11. Default Action (HOBOware Pro Only) - Select this option to configure HOBOware Pro to perform the same action (Launch, Readout, or get Status) every time a logger is connected. See Repeating an Action on Multiple U-Series Devices 40 for more information.
12. Utilities - Select one of the three Force Offload options only if you are having problems reading out your device or as directed from Onset Technical Support.

The Edit Menu

This topic describes the options in the Edit menu.



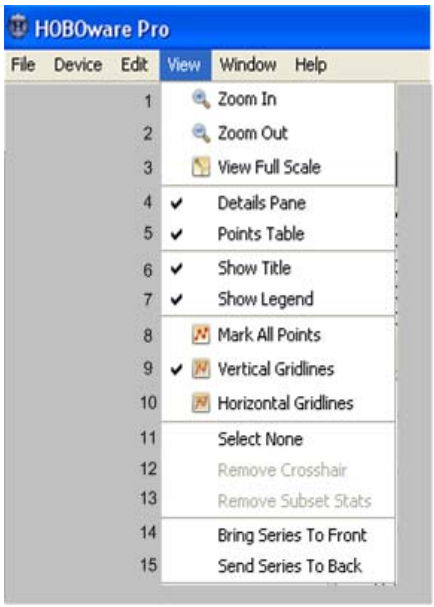
1. Filter Series - Select this option to create a new series based on statistical analysis of an existing series over specified periods of time. See Filtering a Series (page 207) for more information.
2. Copy Series - Select this option to copy a series and then paste it into another plot. See Copying a Series to another Plot (page 67) for more information.
3. Paste Series - Select this option to paste a series into another graph. See Copying a Series to another Plot (page 67) for more information.
4. Add Graph Label - Select this option to access the Graph Label Properties window to add labels to a graph to identify specific points or call attention to a region of the graph. See Adding Labels to a Graph (page 65) for more information.
5. Remove Series - Select this option to remove a series from a plot after you have selected the series in the graph or in the Details pane. If you remove a series, it can only be recovered by reopening the original datafile or a saved project file that contains the series.
6. Graph Properties - Select this option to access the Series Properties window. See Setting Series Properties (page 63) for more information.
7. Convert Units - Select this option to access the Convert Plot window, which allows you to convert some or all of the series on the currently focused plot to other units (for example, from degrees Fahrenheit to degrees Celsius). **NOTE**: Changing the units of a plot will result in the entire plot being redrawn.
8. Undo Action - Select this option to undo the last change made to the current plot. The most recent change is listed after the Undo Action menu choice. In this example, the most recent

change to the plot was to "Click Crosshair." See Undo and Redoing Plot Changes for more information.

9. Redo Action - Select this option to redo the last change that was previously undone. The most recent change that was undone is listed after the Redo Action menu choice. In this example, the most recent change that was undone was "Drag Plot." See Undo and Redoing Plot Changes for more information.
10. Copy Graph to Clipboard - Select this option to copy the graph to the clipboard. You can then paste it into another text editor or word processing application.

The View Menu

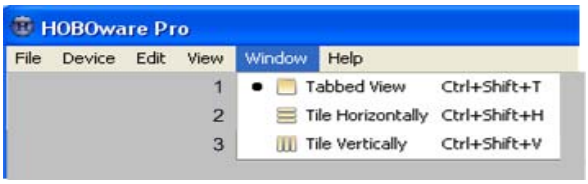
This topic describes the options in the View menu.



1. Zoom In - Select this option to access the Zoom In tool.
2. Zoom Out - Select this option to access the Zoom Out tool.
3. View Full Scale - Select this option to view the graph in full scale.
4. Details Pane - Select this option to show or hide the Details Pane.
5. Points Table - Select this option to show or hide the Points Table.
6. Show Title - Select this option to show or hide the Graph Title.
7. Show Legend - Select this option to show or hide the Legend.
8. Mark All Points - Select this option to mark all points.
9. Vertical Gridlines - Select this option to show or hide vertical gridlines on the graph.
10. Horizontal Gridlines - Select this option to show or hide horizontal gridlines on the graph.
11. Select None - Select this option to deselect all elements in the graph.
12. Remove Crosshair - Select this option to remove crosshairs from the graph.
13. Remove Subset Stats - Select this option to remove a subset from a graph.
14. Bring Series To Front - Select this option to bring a series to the front in a graph.
15. Send Series To Back - Select this option to send a series to the back of a graph.

The Window Menu

Use the **Window** menu to organize several plots.



1. Tabbed View - Layers the plots as tabs so that you can see the file name of each open plot (or "Untitled*" for an unsaved datafile). You can also get to this view by clicking the Tabs icon in the lower left of the window.
2. Tile Horizontally - Arranges up to five plots horizontally. If six or more plots are open, they will be tiled as a grid. You can also get to this view by clicking the Horizontal Tile icon in the lower left of the window.
3. Tile Vertically - Arranges up to five plots vertically. If six or more plots are open, they will be tiled as a grid. You can also get to this view by clicking the Vertical Tile icon in the lower left of the window.

Multiple Views

You can open the same datafile multiple times to create different views of the graph, then use the Tile commands on the **Window** menu (or resize and move the windows manually) to see all of them at once. This is helpful if you want to zoom in on several different areas and view them side-by-side, see the detail of a small area while the full graph is still in view, or view each series in a different window.

The Help Menu

Use the **Help** menu to get more information about HOBOware, upgrade the software and certain devices, and request help from Onset Technical Support.

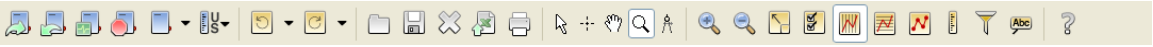
1. HOBOware Help - Select this option to open the help system, displaying the full table of contents.
2. Check for Updates - Select this option to check if there are any HOBOware updates available on the Onset website. You can also set the general startup settings in Preferences to automatically check for software updates on a schedule that you select.
3. Update U-DT-1/U-DT-2 Firmware - Select this option if you need to update the firmware on your shuttle (Part numbers U-DT-1 and U-DT-2 only). You should only need to do this as directed by Onset Technical Support.
4. Manage License Key - Select this option if you need to enter a new license key. This is only necessary if you are running a trial version of HOBOware and have a new license key to enter, or if you are using HOBOware Lite and have a license key to upgrade to HOBOware Pro.
5. Enable Logging - Select this option to turn on logging within HOBOware. When logging is enabled, a series of text files will be generated and saved every time you use HOBOware. It is recommended that you only enable logging when requested to do so by Onset Technical

Support, who may need additional files to troubleshoot any technical problems you may be having with the software.

6. Submit Technical Support Request - Select this option if you are having a problem with HOBOware and would like to request help from Onset Technical Support. Fill in all the requested information in the form, including your name, email address, logger/device model name and serial number, and a detailed description of the problem you are encountering.
7. About HOBOware - Select this option to see which version of HOBOware you are using. Note: This option is available from the HOBOware menu on Macintosh.

The Toolbar

The toolbar, located at the top of the main HOBOware window, allows point-and-click access to the most frequently used functions. Pause the pointer over each icon on the toolbar for a description of each tool.



Launch - Opens the Launch window.

Readout - Opens the Readout window.

Status - Opens the Status window, which displays the logger's state and current readings.

Stop - Stops a logging logger.

Select Device - Opens the select Device window, which displays available devices. For HOBOware Pro, the accompanying pulldown menu allows you to specify whether you want HOBOware to look for USB devices, serial devices, or both.

Set Default Units - Change the default unit type between US and SI. Any changes you make will take effect with the next plotted file.

Undo Action - Undoes the most recent change made to the plot.

Redo Action - Redoes the most recent change that was undone to the plot.

Open - Launches the Open window, from which you can open HOBOware files.

Save - Opens the Save window, from which you can save the plot as a project (.hproj) file.

Close - Closes the currently focused plot.

Export - Opens the Export Options window, from which you can configure settings for exporting a text file of the data (in .csv or .txt format) for use in spreadsheet and other applications.

Print - Prints the graph as it appears on your screen.

Arrow - Launches the Arrow Tool, which you can use to point to and select items on the graph to edit their properties.

Crosshair - Launches the Crosshair Tool, which you can use to display values for points on the graph and cross-references them to cells in the Points pane.

Hand - Launches the Hand Tool, which you can use to scroll an axis or the entire graph.

Zoom - Launches the Zoom Tool, which you can use to adjust the scaling of an axis or the entire graph.

Subset Statistics - (HOBOware Pro Only) Launches the Subset Statistics Tool, which you can use to view statistics for a particular time span.

In - Launches the Zoom In Tool, which allows you to zoom in on a smaller area of the graph.

Out - Launches the Zoom Out Tool, which allows you to zoom out to a larger area of the graph.

Show Graph at Full Scale - Resets the scale of a graph to accommodate all of the displayed data.

Graph Properties - Opens the properties window for the element currently selected (such as series, legend, axis).

Vertical Gridlines - toggles vertical gridlines on or off.

Horizontal Gridlines - toggles horizontal gridlines on or off.

Mark Points - toggles point markers on or off.

Units - Opens the Convert Units window, which allows you to convert some or all of the series on the currently focused plot to other units (for example, from degrees Fahrenheit to degrees Celsius).

Filter Series - You can create a new series based on statistical analysis of an existing series over specified periods of time.

Add Graph Label - Opens the Graph Labels Properties dialog, which allows you to add a label to the plot or to a specific series, and change the appearance of that label.

- Help - opens the Help.

The Arrow Tool

There are two ways to select the arrow tool:

- Click the Arrow icon on the toolbar; or
- Press the **A** key on your keyboard

Tip: If you are currently using another tool and do not want to switch tools, you can press the **N** (next) key on your keyboard to select each graph item (including hidden items, such as value axes for states or events) in sequence.

The selected item (if visible) is shaded or boxed. You can then right-click the selected item, double-click it, or press the **Enter** key on your keyboard to open the Properties window for that item.

To deselect, click an area within the axes that does not have series data; click the **View** menu and choose *Select None*; or press *D* on your keyboard.

Using the Crosshair Tool

Use the crosshair tool to zero in on a specific date and time in the plot and any data points associated with that date and time.

1. Select the crosshair tool:

Click the Crosshair icon on the toolbar, or press the **C** key on your keyboard

2. Click a point on the graph to mark it.
3. Click another point to move the marker.

NOTE: When you click on a graph, HOBOware selects the nearest data point. When series are very close together, and the location you click is between two points, it is possible that the nearest point is not on the series you clicked.

You can also mark the point on the graph by clicking the corresponding cell in the Points table.

Scrolling

Normally, if you are zoomed in and click a point in the Points table that is outside the zoom area, HOBOware will scroll to the marked point's area of the graph. If you do not want HOBOware to scroll, change the setting under **Points Table & Details Pane** on the Plotting preference pane.

Changes to Plot

The plot changes in several ways when the crosshair is in use. The Points pane shifts to the row that contains the data point. Where the crosshair intersects a data point, a square surrounds the data point. The intersection points are also marked by small color-coded arrows on the left and right value axes.

Legend

If the legend is displayed next to the graph, the point values for each series are updated to reflect the crosshair location. Values are listed in the legend differently depending on whether the data is a logged sample, state, or event:

- Values that are not in parentheses are actual data points logged at the time selected by the crosshair.
- Values in parentheses are estimated because there were no exact values for the series at the time selected by the crosshair. Zoom in or move the crosshair to see actual values.
- A value of "…" indicates that there is no series data during the time selected. This is seen most frequently for events. If the time selection falls within an event series, but does not contain an event, parentheses surround the "…" value.
- A value of "logged" indicates an internal logger event happened at the selected time.

NOTE: The legend must expand in height to list the point values. If your application window is too small to accommodate the expanded height, the values will not be added to the legend. You can still refer to the Points table to find the values of the selected points.

Removing the Crosshair

To remove the crosshair from the graph, right-click on the graph and select **Remove Crosshair** from the pop-up menu. Or, choose **Remove Crosshair** from the View menu.

The Zoom Tool

Overview

Use the zoom tool to focus on one area of the graph, allowing you to see more detail.

NOTE: Zooming will not work on an axis that is locked. To unlock an axis, double-click the axis with the arrow tool and clear the checkmark next to **Lock Axis Scaling and Tick Marks**.

Using the Zoom Tool

To select the zoom tool:

- Click the Zoom icon on the toolbar; or
- Press the **Z** key on your keyboard.

Toggle

Right-click to toggle between zoom in and zoom out.

Zoom Direction

Check the symbol inside the zoom tool to determine the direction you are zooming. A plus sign (+) or arrows pointing outward will zoom in, while a minus sign (-) or arrows pointing in will zoom out.

Level

Click an area on the graph inside the axes to zoom one level (a factor of two). Continue clicking to zoom multiple levels.

Zoom Continuously

Hold down the left mouse button in one location to zoom continuously. Release the mouse button to stop zooming.

Zoom in Area

Hold down the left mouse button while drawing a rectangle around the area you wish to zoom in on, then click inside the rectangle. The area inside the rectangle expands to fill the whole graph.

Restrict Motion

Hold down the **X** key while zooming to restrict motion horizontally. Hold down the **Y** key while zooming to restrict motion vertically.

Tips:

- If you are currently working with the crosshair, arrow, or hand tool, you can click the Zoom In/Out icons and on the toolbar to quickly zoom into and out of the middle of the display without changing tools.
- When you first display a graph, the numerical bounds of the axes are on tick marks. After you have panned or zoomed, this may no longer be the case. Use smart scaling to correct that. With the hand, arrow, or crosshair tool, right-click anywhere on the graph and select **SmartScale Graph**. This will automatically adjust the axes to end on tick marks.
- You can always return to the original plot view by clicking the View at Full Scale from the toolbar or the View menu.

The Hand Tool

Overview

Use the hand tool to move different areas of the graph into view or adjust the position of one series so it can be viewed more easily. This is particularly useful when you are zoomed into the graph and want to see another section of the graph without zooming out and then zooming back in on the new location.

NOTE: Panning will not work on an axis that is locked. To unlock an axis, double-click the axis with the arrow tool and clear the checkmark next to **Lock Axis Scaling and Tick Marks**.

Using the Hand Tool

There are two ways to select the hand tool:

- Click the Hand icon on the toolbar; or

- Press the **H** key on your keyboard.

Pan Across Graph

Click within the graph and hold down the left mouse button to pan a different section of the graph into view. The graph follows the movement of the mouse, and the axes are continuously updated in response to the movement. To stop dragging, release the left mouse button.

Restrict Motion

Hold down the **X** key while dragging to restrict motion horizontally. Hold down the **Y** key while dragging to restrict motion vertically.

Pan One Series at a time

Click the axis associated with the series and hold down the left mouse button. Only the series connected with the axis will follow the movement of the mouse.

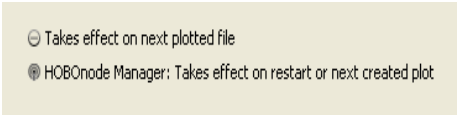
Tips:

- When you first display a graph, the numerical bounds of the axes are on tick marks. After you have panned or zoomed, this may no longer be the case. Use smart scaling to correct that. With the hand, arrow, or crosshair tool, right-click anywhere on the graph and select **SmartScale Graph**. This will automatically adjust the axes to end on tick marks.
- You can always return to the original plot view by clicking the View at Full Scale from the toolbar or the View menu.

Setting Preferences

You can change the default behavior of HOBOware in the categories listed below. Preference settings are unique for each user login on your computer.

Some preferences have one of the following icons next to them, indicating a difference in behavour between HOBOware and HOBOnode Manager.



General

Set Preferences for Export Settings, Selecting Devices, File Associations, Startup, Time-Saving Options *, and Data Verification *.

* indicates that preference is available in HOBOware Pro Only

Communications

Set Preferences for Device Types *, Serial Ports *, Device Speed, and Other Options.

* indicates that preference is available in HOBOware Pro Only

Plotting

Set Preferences for Fonts, Layout Points Table and Details Pane, Gridlines, Plot Setup, and Other Options.

Data Assistants (HOBOware Pro Only)

Set show/hide preferences for HOBOware Pro Data Assistants.

Display

Set Preferences for Default Unit System and Date/Time.

Warnings

Set Preferences for various warning types.

Data Nodes

Set preferences for HOBOnode Manager including General, Alarm, and Advanced (for data storage).

General Preferences

Use the General Preferences to control a variety of HOBOware behavior. You access the General Preferences by going to File > Preferences > General.

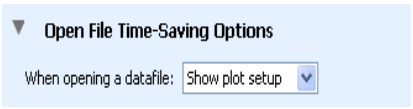
Launch Time-Saving Options

See Launch-Time Saving Options on page 38.

Readout Time-Saving Options

See Readout Time-Saving Options on page 52.

Open File Time-Saving Options



- When opening a datafile:

Show plot setup (default)

When opening a datafile, HOBOware Pro displays the Plot Setup window.

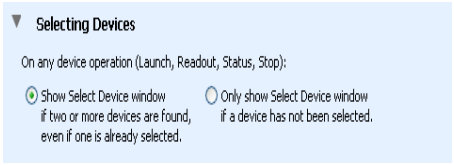
Automatically plot

Select this option to bypass the Plot Setup window and automatically generate the plot .

Export Settings

See Export Settings on page 220.

Selecting Devices


Selecting Devices
On any device operation (Launch, Readout, Status, Stop):
Show Select Device window if two or more devices are found, even if one is already selected.
Only show Select Device window if a device has not been selected.

- Show Select Device window ..... (default)

When multiple loggers are connected, HOBOware displays a window listing all connected loggers every time you choose a logger operation, such as launch, readout, status, or stop. This allows you to choose the device you want to work with before continuing with the command, and it ensures that you are always working with the logger you expect.

- Only show Select Device window if a device has not been selected

Select this option if you do not want to be prompted by the Select Device window every time you choose a logger operation. You will still be prompted the first time you try to communicate with a logger, but your logger selection will remain in effect until you change it manually with the **Select Device** command on the Device menu.

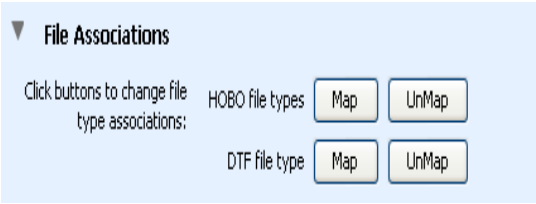
File Associations (Windows Only)

Use this option to control the association of file types with HOBOware.

NOTE: You must have administrator privileges on the computer to change file type associations.

HOBO file types are: .hobo, .hsec, and .hproj.

DTF file types are: .dtf and .dsec.



- Click buttons to change file type associations.

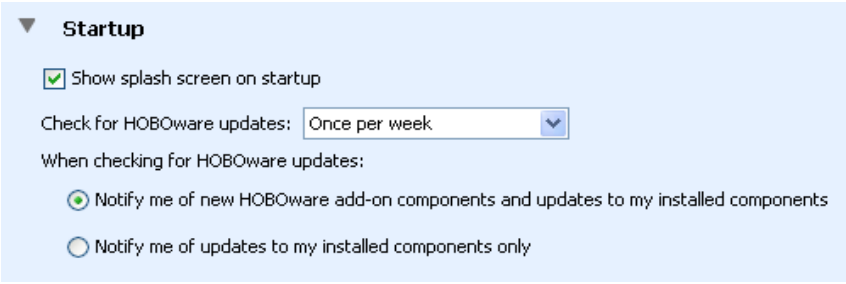
Map

After you install HOBOware, files with extensions of .hobo, .hsec .dtf, .dsec, and .hproj are automatically associated with HOBOware. This means that these files are identified by a HOBOware icon and can be opened by double-clicking them.

Unmap

Select this option to disable the association of file extensions with HOBOware to avoid conflicts with another software application.

Startup


Startup
Show splash screen on startup
Check for HOBOware updates:
Once per week
When checking for HOBOware updates:
Notify me of new HOBOware add-on components and updates to my installed components
Notify me of updates to my installed components only

- Show splash screen on startup (enabled by default)

Select this option if you want the HOBOware graphic, or splash screen, to appear every time you open the software.

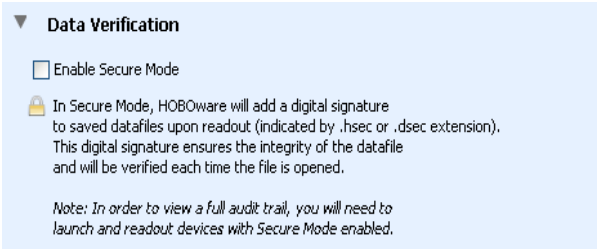
- Check for HOBOware updates

This setting controls how frequently, if it all, HOBOware automatically checks the Onset website to see if any software updates are available. The default setting is once per week.

- When checking for HOBOware updates:

These settings control whether you are notified about any new software updates or only those that affect your currently installed components. The default is to check for any new updates (Notify me of new HOBOware add-on components and updates to my installed components).

Data Verification (HOBOware Pro Only)

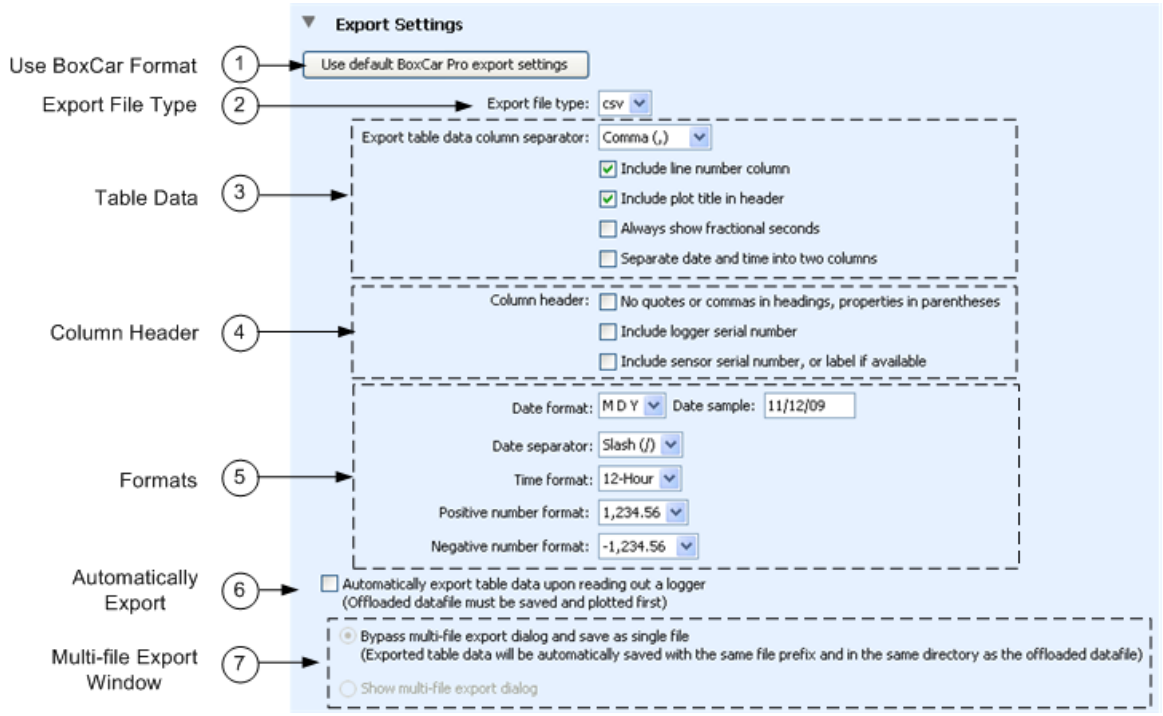

Data Verification
Enable Secure Mode
In Secure Mode, HOBOware will add a digital signature
to saved datafiles upon readout (indicated by .hsec or .dsec extension).
This digital signature ensures the integrity of the datafile
and will be verified each time the file is opened.
Note: In order to view a full audit trail, you will need to
launch and readout devices with Secure Mode enabled.

- Enable Secure Mode (disabled by default)

Select this option to enable Secure Mode and have HOBOware Pro add a digital signature to new datafiles when you read out loggers. The digital signature is indicated by a filename extension of .hsec for hobo files and .dsec for dtf files. The signature will be verified each time you open the datafile to ensure its integrity. This option is turned off by default.

Export Settings

Use this window to customize how your data is formatted when you export a data file. You access the Export Settings by going to File > Preferences > General > Export Settings



1. Use Boxcar Format

Click the Use default BoxCar Pro export settings button to export data using the default settings for Onset's Boxcar Pro software, which are shown in the screen capture at the bottom of this page.

2. Export File Type

Select the file type: Excel (.xls) or Text (.csv or .txt).

3. Table Data

(This section does not apply for .xls File Type)

Select the desired Export table data column separator.

When **Comma** is selected as the column separator, the default file type is .csv, which can be imported automatically into Microsoft Excel.

When **Tab** or **Semicolon** is selected for the column separator, the default file type is .xls).

Other options: Select or deselect options as desired.

- Include line number column

  By default, exported files include line numbers. Uncheck this box if you do not want line numbers included in the file (for example, to export in Onset's BoxCar-like format)

- Include plot title in header

  Deselect this option if you do not want the plot title included in the header. This option is primarily for compatibility with Onset's BoxCar Pro software format.

- Always show fractional seconds

  Select this option for compatibility with Onset's BoxCar Pro software format.

- Separate date and time into two columns

  This setting controls how the columns in the Points table are separated in the export file. By default, date and time are exported as a single column to facilitate graphing in spreadsheet programs. If enabled, this setting splits the date and time into two columns.

4. Column Header

   - No quotes or commas in headings, properties in parenthesis

     Select this option for compatibility with Onset's BoxCar Pro software format.

   - Include logger serial number

     This setting adds the logger's serial number to each column header when you export the Points table. This is especially useful if you are exporting series that were copied and pasted from plots that came from different loggers.

   - Include sensor serial number, or label (if available) (HOBOware Pro only)

     If this option is selected, the sensor's serial number (if available) is added to each column header when you export the Points pane. This is especially useful if you are exporting data that includes similarly named series that were recorded on different sensors; for example, a HOBO Weather Station datafile with data from three temperature sensors.

     If *No quotes or commas in headings, properties in parentheses* is selected, the label, if available, will be added instead of the sensor serial number.

     NOTE: In order to export the label, you must also select **Include sensor Label (if available) in points table and details pane** in the Plotting Preferences pane.

5. Formats

   - Date Format - Select the format in which you want the date to be shown.

   - Date Separator - Select either a slash (/) or a dash (-) to separate month, days, and year.

- Time Format - Select whether you want HOBOware to show the time in a 12-hour or 24-hour format. The default is 12-Hour.
- Positive Number Format - Select the desired format for positive numbers
- Negative Number Format - Select the desired format for negative numbers

6. Automatically Export

Select *Automatically export table data upon reading out of a logger* if you want the data to be exported to a separate text file every time a logger is readout and you plot the data by clicking **Plot** in the **Plot Setup** window. An export file is saved in addition to the standard data file.

7. Multi-File Export Window

- Bypass Multi-file Export

By default, the data will be exported to a single text file with the same prefix and in the same location as the datafile. To export multiple files, uncheck this option.

- Show multi-file export dialog

Select this option to save the exported data to multiple files, which may be helpful if the datafile is very large.

Important: Do not select "Show multi-file export" if you will be using the Bulk Export Tool or the Data Delivery feature in HOBOnode Manager. This option must be completely disabled for those tools to work properly, which means it cannot be selected even if the option is grayed out because the "Automatically export table data..." setting is disabled.

BoxCar Pro Format Settings

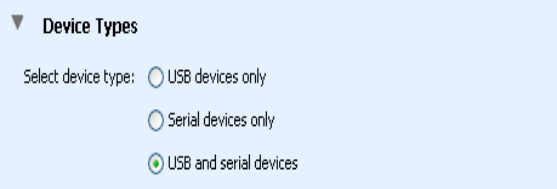
Export Settings
Use default BoxCar Pro export settings
Export file type:
Text (.txt or .csv)
Export table data column separator:
Tab
Include line number column
Include plot title in header
Always show fractional seconds
Separate date and time into two columns
Column header:
No quotes or commas in headings, properties in parentheses
Include logger serial number
Include sensor serial number, or label string if available
Date format:
M D Y
Date sample:
12/03/09
Date separator:
Slash (/)
Time format:
24-Hour
Positive number format:
1,234.56
Negative number format:
-1,234.56
Automatically export table data upon reading out a logger
(Offloaded datafile must be saved and plotted first)
Bypass multi-file export dialog and save as single file
(Exported table data will be automatically saved with the same file prefix and in the same directory as the offloaded datafile)
Show multi-file export dialog

Communication Preferences

The following preferences are available on the Communications pane:

You access the Communication Preferences by going to File > Preferences > Communications.

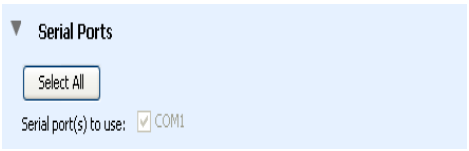
Device Types (HOBOware Pro Only)



- Select device type

If you use only USB loggers or only serial loggers, click the appropriate button for improved logger response time. Otherwise, if you use both types of loggers regularly, keep the default of USB and serial devices. You can quickly change this preference by using the pull-down menu next to the Select Device icon on the toolbar.

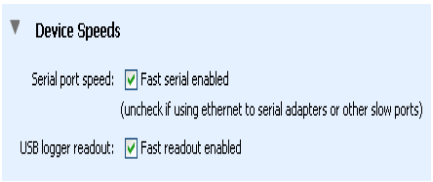
Serial Ports (HOBOware Pro Only)



- Serial port(s) to use

Select the specific serial ports you want HOBOware Pro to search for devices, or click Select All to have HOBOware Pro check all of the serial ports shown on this list when it searches for devices. Note that if you want HOBOware Pro to use only one port, you can have only one serial logger connected at a time. However, checking multiple ports can cause slow performance, even when no loggers are connected.

Device Speeds


Device Speeds
Serial port speed:
Fast serial enabled
(uncheck if using ethernet to serial adapters or other slow ports)
USB logger readout:
Fast readout enabled

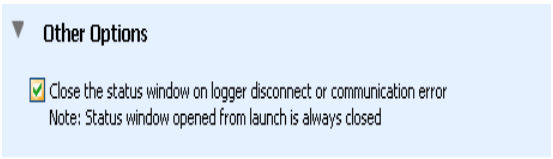
- Serial port speed: Fast serial enabled (HOBOware Pro only)

This setting allows the computer to read out your serial logger at a speed that is appropriate for most systems. Disable this option only if you are having communication problems with the logger; for example, when the logger is connected via a slow serial-to-LAN bridge device. Communication between the computer and the logger is slower when this option is turned off.

- USB logger readout: Fast readout enabled

This setting allows the computer to read out your USB logger quickly. Disable this option only if you are having communication problems with the logger. Communication between the computer and the logger is slower when this option is turned off.

Other Options


Other Options
Close the status window on logger disconnect or communication error
Note: Status window opened from launch is always closed

- Close the status window on logger disconnect or communication error.

When this option is selected, the Status window closes automatically (on the next refresh) if it is open when you remove the interface cable, base station, or coupler from the logger, or if communication is interrupted for another reason. Otherwise, it is left open. If the Status window was opened from the Launch window, it will close automatically even if this option is not selected.

Plotting Preferences

Use the Plotting Preferences to control a varierty of aspects of a plot.

You access the Plotting Preferences by going to File > Preferences > Plotting

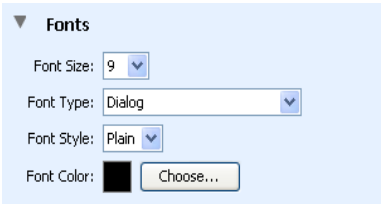
To apply certain preferences to a single series, double-click the series to open the Series Properties window.

To apply changes to real-time HOBO Data Node plots in HOBOnode Manager, restart HOBOnode Manager or delete the plot for the sensor (by unchecking the Plot box) and then re-checking it.

Fonts

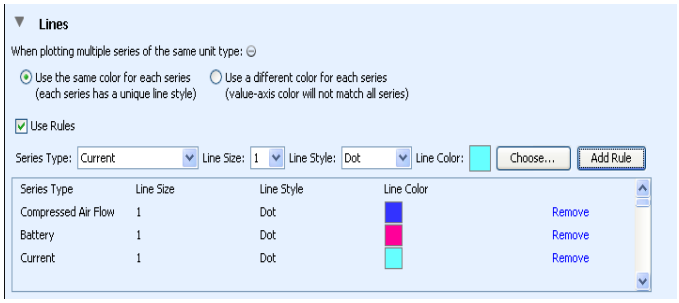
Use the Fonts Preferences to controls the size, type, style, and color for most text on the graph.

NOTE: The plot title font will be two points larger than the selected font size.



Lines

Use the lines preferences to define the appearance of lines in the plot for a specific series type. Rules added will appear in the panel at the bottom. Only one rule can be added per series type. To delete a rule, click the delete button on the row.


Lines
When plotting multiple series of the same unit type:
Use the same color for each series (each series has a unique line style)
Use a different color for each series (value-axis color will not match all series)
Use Rules
Series Type: Current
Line Size: 1
Line Style: Dot
Line Color:
Choose...
Add Rule
Series Type
Line Size
Line Style
Line Color
Compressed Air Flow 1 Dot Remove
Battery 1 Dot Remove
Current 1 Dot Remove

- When plotting multiple rules of the same type: Select desired option.

Use the same color for each series (default)

By default, if there are multiple series of the same unit type (for example, temperature and dew point series in degrees Fahrenheit), plots all of the series in the same color, and uses a different line style (solid, dashed, dotted, etc.) for each.

Use a different color for each series

Select this option if you prefer each series to have a solid line in a different color. The series will still be attached to a single, common axis, but only one series will match the axis color.

- User Rules check box - Check to enable using line rules on the plots.

- Series Type - Select the series type to apply the rule to.
- Line Size/Line Style/Line Color

Select options to define the appearance of the lines in the plot. Click the Choose button to select a color.

Line size style and color will be applied on series lines, its corresponding value axis, and its corresponding representation in the legend. These settings can be overridden for the series and value axis by double clicking on them to show the properties window.

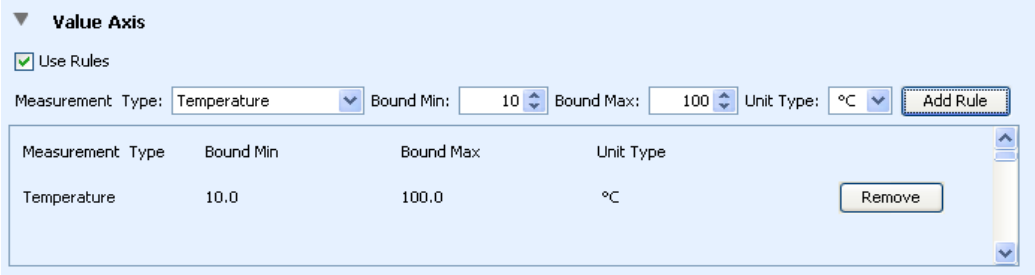
- Add Rule button - Click the Add Rule button to add the rule to the series type.

To add another rule, select a new option from the Series Type drop-down, select options, and then click Add Rule.

Value Axis

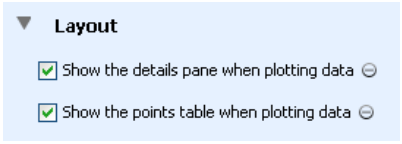
Use the Value Axis Preferences to apply a minimum and maximum value for the Y-Axis to for plots for a specific series type. Rules added will appear in the panel at the bottom. Only one rule can be added per series type. To delete a rule, click the delete button on the row.

Bounds are applied on Series Value Axis. These settings can be overridden on a specific plot by double clicking on the axis and changing the Bounds values in the Y-Axis Properties window.



- User Rules check box - Check this box to enable the rules.
- Measurement Type - Select the series type to apply the rule to.
- Bounds Min. and Max - Select the minimum and maximum values for the axis.
- Unit Type - Select the desired units.
- Add Rule button - Click the Add Rule button to add the rule.

Layout



- Show the details pane when plotting data

HOBOware Pro: By default, the Details pane is open when you display a plot. If you want the Details pane to be hidden when you display a plot, clear this box.

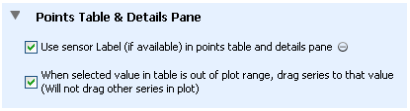
HOBOware Lite: By default, the Details pane is not open when you display a plot. If you want the Details pane to be shown when you display a plot, check this box.

- Show the points table when plotting data

HOBOware Pro:By default, the Points table is open when you display a plot. If you want the Points table to be hidden when you display a plot, clear this box.

HOBOware Lite: By default, the Points table is not open when you display a plot. If you want the Points table to be shown when you display a plot, check this box.

Points Table & Details Pane


Points Table & Details Pane
Use sensor Label (if available) in points table and details pane
When selected value in table is out of plot range, drag series to that value (Will not drag other series in plot)

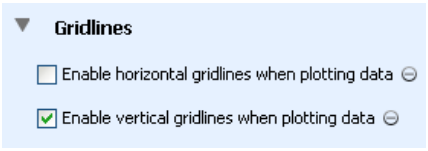
- Use sensor Label (if available) in points table and details pane (HOBOware Pro Only).

This setting adds the sensor's label, if it has a label defined, to each column header in the Points table and to the Details pane. This is especially useful if you have data that includes similarly-named series that were recorded on different sensors; for example, a HOBO Micro Station datafile with data from three voltage sensors.

- When selected value in table is out of plot range, drag series to that value.

Normally, if you are zoomed in and click a point in the Points table that is outside the zoom area, the plot will scroll so that the marked point is in view, while retaining your zoom factor. Clear this box if you do not want to scroll to points outside of the current view.

Gridlines



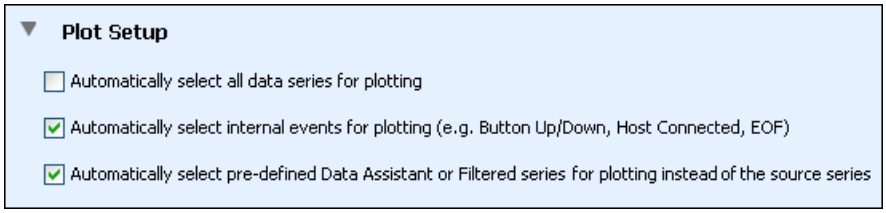
- Enable horizontal gridlines when plotting data.

By default, horizontal gridlines are not displayed when you open a plot. Enable this option if you always want a new plot to display gridlines for all value axes.

- Enable vertical gridlines when plotting data.

By default, vertical gridlines are always displayed when you open a plot. Clear this checkbox if you never want a new plot to display gridlines for the time axis.

Plot Setup


Plot Setup
Automatically select all data series for plotting
Automatically select internal events for plotting (e.g. Button Up/Down, Host Connected, EOF)
Automatically select pre-defined Data Assistant or Filtered series for plotting instead of the source series

- Automatically select all data series for plotting

By default, when you read out a logger or open a datafile, some series (such as Dew Point) are not selected for display on the Plot Setup window. Enable this option if you want every series to be selected.

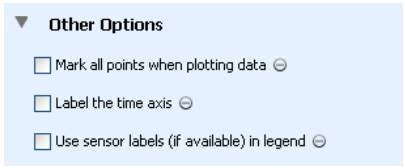
- Automatically select internal events for plotting (e.g. Button Up/Down, Host Connected, EOF)

When you open a plot, internal events are selected by default on the Plot Setup window. Clear this box if you usually do not want to see these events.

- Automatically select pre-defined Data Assistant or Filtered series for plotting instead of the source series

This option controls whether any series from Data Assistants and filters that you configured in the Launch Logger window are pre-selected in the Plot Setup dialog. When this option is selected, Data Assistants and Filtered series will automatically be pre-selected in the Plot Setup dialog. If this option is not selected, then the raw data, or source series, used for generating the Data Assistants or filtered series will be pre-selected in the Plot Setup dialog instead.

Other Options



- Mark all points when plotting data

By default, when you display a plot, point markers are displayed for any series with event data. Otherwise, to avoid cluttering the graph, point markers are not displayed. Enable this option if you want all points to be marked on every series whenever you display a plot. On a large plot, marking all points takes longer and consumes more system memory. Series that consist of only one point are always marked.

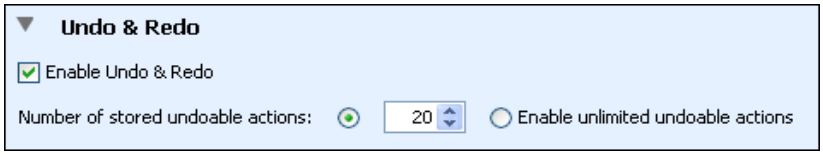
- Label the time axis

By default, the time axis is not labeled when you display a plot. If you enable this preference, the time axis will have a default name of "Time" when you open a plot.

- Use sensor labels (if available) in legend

If a label has been assigned to a sensor, include it in the legend.

Undo & Redo



- Enable Undo & Redo

This controls whether you can undo and redo the changes you make to plots. By default, this feature is enabled.

- When the Undo & Redo preference is enabled, you can specify how many changes to plots will be stored within HOBOware.
    - If you select "Number of stored undoable actions," then there will be a limit to the number of changes to the plots that you can undo. For example, if you choose to store 25 undoable actions, then you will be able to undo the last 25 changes that you made to the plots, but not the 26th. You can configure HOBOware to store from 1 to 50 undoable actions (changes to the plot) with this setting.
    - If you select "Enable unlimited undoable actions," then there will be no limit to number of changes to the plots that you can undo. Note that storing an unlimited number of actions can impact HOBOware performance on slower computers.

Data Assistant Preferences

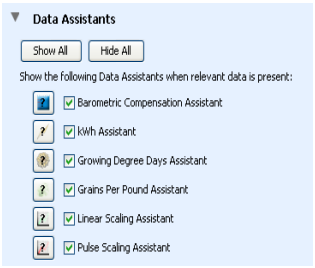
Use the Data Assistants Preferences to Show or Hide Data Assistants when you plot data.

You access the Data Assistants Preferences by going to File > Preferences > Data Assistants

By default, when you read out a logger or open a datafile, all compatible assistants are listed in the Plot Setup window.

To prevent an assistant from being listed in the Plot Setup window, clear the box next to its name. To re-enable an assistant that you have previously disabled, check the box next to its name.

To enable all of the data assistants, click **Show All**. To disable all of them, click **Hide All**.

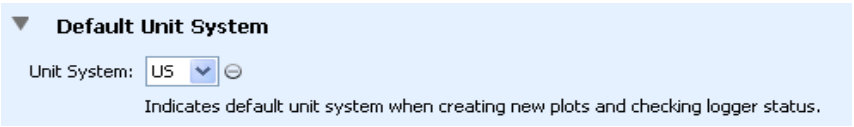


Display Preferences

Use the Display Preferences to control the default units and date/time format in plots. You access the Startup Preferences by going to File > Preferences > Display

Default Units

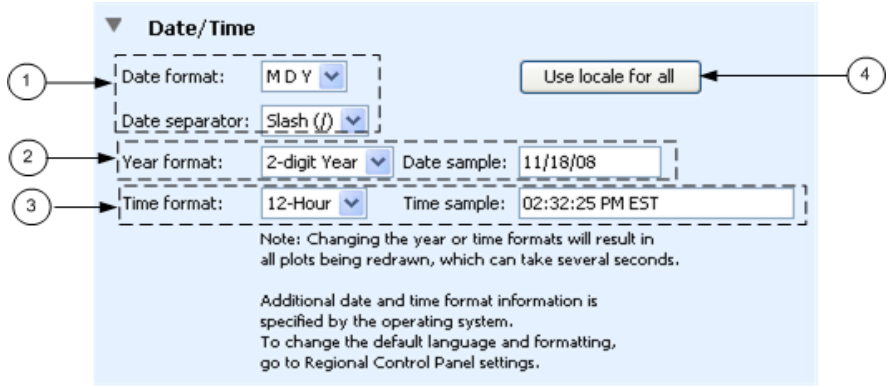
This setting allows you to set a default of US or SI (Metric) units throughout HOBOware . It changes the units in the Current Readings the next time you display the Status window, and the default units in the axis, legend, points, and details the next time you display a plot. The default is *US*.



Date/Time

In this section you can configure the date and time to your desired format.

NOTE: When you create an export file, the date and time are exported as they appear in the Points table. If you open the file in Excel, they are automatically reformatted to Excel's default date and time format, which you may customize within Excel.


Date/Time
1
Date format: M D Y
Date separator: Slash (/)
Use locale for all
4
2
Year format: 2-digit Year
Date sample: 11/18/08
3
Time format: 12-Hour
Time sample: 02:32:25 PM EST
Note: Changing the year or time formats will result in all plots being redrawn, which can take several seconds.
Additional date and time format information is specified by the operating system.
To change the default language and formatting, go to Regional Control Panel settings.

1. Date

    - Date format - Select the format in which you want the date to be displayed.
    - Date separator - Select the character you want to be place between date elements.

2. Year format

Select whether you want HOBOware to display the year as two digits or four. The default is 2-digit Year. Changing this setting will cause all open plots to be redrawn. An example of the currently selected format is shown to the right in the **Date sample** box.

3. Time format

Select whether you want HOBOware to display the time in a 12-hour or 24-hour format. The default is 12-Hour. Changing this setting will cause all open plots to be redrawn. An example of the currently selected format is shown to the right in the **Time sample** box.

4. Use locale for all

Check this box to have all options set to the default settings for the current locale.

Warnings Preferences

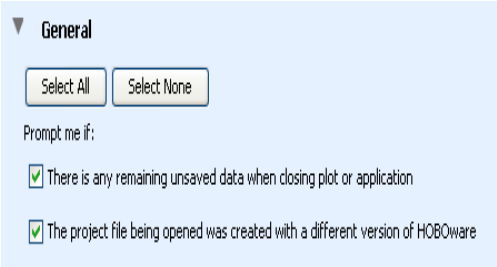
Use the Warnings Preferences to disable warning pop-ups that you do not want to appear. Before you do so, however, keep in mind that the warnings are intended to help prevent mistakes and inadvertent data loss. Review each warning carefully before disabling it. To re-enable a warning, re-select the check box.

To disable all of the warnings in a group, click the **Select None** button for that group.

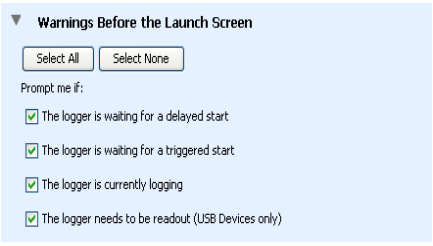
To enable all of the warnings in a group, click the **Select All** button for that group.

You access the Warnings Preferences by going to File > Preferences > Warnings.

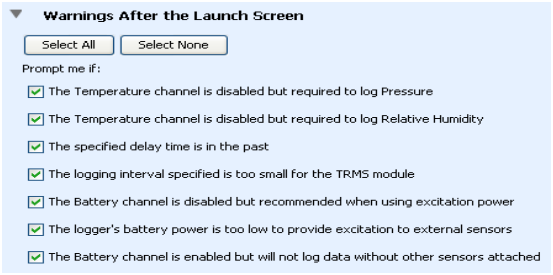
General


General
Select All
Select None
Prompt me if:
There is any remaining unsaved data when closing plot or application
The project file being opened was created with a different version of HOBOware

Warnings Before the Launch Screen

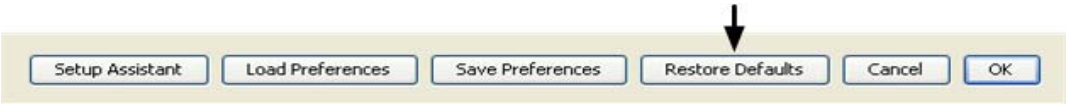

Warnings Before the Launch Screen
Select All
Select None
Prompt me if:
The logger is waiting for a delayed start
The logger is waiting for a triggered start
The logger is currently logging
The logger needs to be readout (USB Devices only)

Warning After the Launch Screen

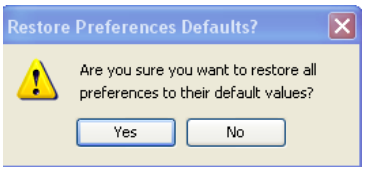

Warnings After the Launch Screen
Select All
Select None
Prompt me if:
The Temperature channel is disabled but required to log Pressure
The Temperature channel is disabled but required to log Relative Humidity
The specified delay time is in the past
The logging interval specified is too small for the TRMS module
The Battery channel is disabled but recommended when using excitation power
The logger's battery power is too low to provide excitation to external sensors
The Battery channel is enabled but will not log data without other sensors attached

Restoring Default Preferences

To return all preferences to their original settings in both the Preferences and custom-defined Launch Logger window settings (State Description, % or Time, Logging Interval), click the **Restore Defaults** button.



The following window appears.



Click **Yes**. The default settings for all preference are restored.

Other Settings

In addition to the options configured in the Preferences window, HOBOware reverts to the following settings:

- Data File Folder Locations

Defines each user account's preferred folder locations for datafiles, text files, and project files. The three folder locations are tracked separately based on the folders you last accessed. When you restore the preference defaults, the default folder for each file type is reset to the HOBOware folder in your My Documents (Windows) or Finder (Mac) folder.

- FlexSmart modules or Analog Sensor Ports (HOBOware Pro Only

Custom-defined channel names and units for FlexSmart modules or Analog Sensor Ports are stored as preferences. When you restore the preference defaults, the custom-defined channel names and units are removed from the pull-down menus in the Configure Channel window. However, this will not affect customized channel names and units that you saved in configuration files (.hcfg).

- HOBOware software updates

The date and time of the most recent check for HOBOware software updates. When you restore the preference defaults, HOBOware will not retain this date, and will offer to check for updates the next time you restart HOBOware.

- Custom-defined Launch Logger window menus

Any custom-defined Launch Logger window settings, such as State Description, % or Time, Logging Interval.

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